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ARY OF CONGRESS
OCT 11 1939
Division of Aeronautics

FEBRUARY HARLOW ALL METAL 2-PLACE CABIN MONOPLANE 1939

Southern Flight

The Birdmen's Perch

Next to the Whopper Club, the most popular feature of the Perch is the Problem Dept. Every month, more and more answers (some right . . . some wrong) come in to be corrected. This month we're getting away from mathematics for a trial hop in plain and simple visualization. Let's hear how you like it.

MAJOR AL WILLIAMS, alias "Tattered Wing-Tips,"
Mgr. Gulf Aviation Products, Gulf Bldg., Pittsburgh, Pa.

AVIATION QUIZ

Can you identify the five following titles?

1. "The Winged Sword of France"
2. "The Black Eagle"
3. "The Red Knight of Germany"
4. "The Flying Scot"
5. "The Balloon Buster"

(T. W. T. has the correct answers, fellas. Send in yours and he'll red pencil 'em for you.)

CLEANED

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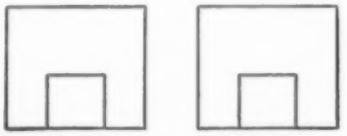
A MATTER OF PERSPECTIVE

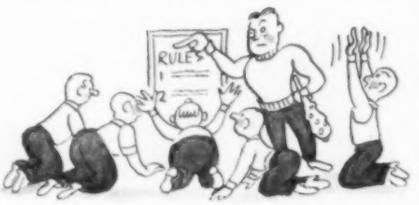
Here's a problem sent us by Ralph B. Oakley of Inglewood, Calif., who says it's a part of a test given by airplane factories to prospective employees. The object is to draw the third or side view of an object when the top and front views are given.



TOP VIEW FRONT VIEW

Mail your sketch to T.W.T. and we'll send back the official rendering of what the darn thing looks like. We warn you . . . you'll be plenty surprised.

CLUB CORRESPONDENCE

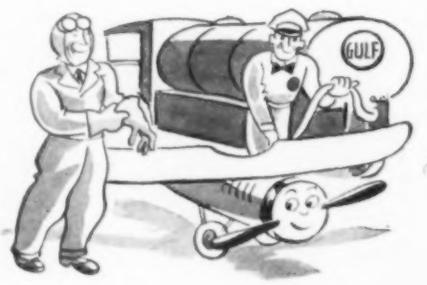


We have a note from Fred Scace who is president of the Berkshire Airmen's Club, Inc., in Pittsfield, Mass. The boys up that way evidently have a very successful organization and Fred offers to try to answer any other club officer's special problems if you'll write him direct. Generally speaking he says that there are two main grief-saving rules to observe from the beginning:

1. *Don't try to operate on too close a budget the first year.*
2. *Adhere strictly to C. A. A. regulations.*

We second both motions. And, because we have a lot of faith and interest in the contribution club flying is making to aviation, we hereby throw open the columns of the Perch to any worth-while slants or wrinkles our readers may contribute.

THIS MONTH'S WHOPPER



Dear Major:

Bright and early one morning I took my flying flea out for an altitude test. Thought I'd try 'er out with a little of this Gulf Aviation Gas I hear so much about. Gave 'er about five gallons.

Well, sir, she jumped clean over her chocks and up we shot! 10,000, 15,000 . . . 20,000, 30,000 . . . 50,000! I was taking on altitude at such speed that the sparks from my exhaust caught the tail of my flea on fire!

Right then the altimeter broke at 68,000, a new world's record! But it was so cold that the flame froze stiff as a board! Still I wasn't takin' no chances. I took 'er down and wheeled 'er into the hangar. But the change in altitude musta' made me forget about the fire.

A few seconds later a grease monkey came rushing over screaming like an Indian. "Hey, look at your flea, Captain!"

Sure enough. The flame has thawed out and there's my poor flying flea gyrating all over creation beating its tail on the ground to put out the fire!

Capt. E. Norman Dambacher

Gulf Oil Corporation and Gulf Refining Company . . . makers of

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Southern Flight

FEBRUARY, 1939 VOL. XI. No. 2

The complete monthly digest of aeronautics in the South and Southwest.

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Strength From Prosperity

HERR HITLER brought the world to its slow moving feet by demonstrating what air power can do, no matter what a nation's enemies have in the way of ground forces, sea going battle wagons or military reserves. And he did it without firing a shot.

Our own congressional discussions over the appropriations for new aircraft consistently include allusions to what happened in Munich last September and to the present European crisis. In fact the entire public mind has come to demand adequate air power for the United States simply because it has seen our own weakness and the shortcomings of other democratic nations mirrored in the strength of a rejuvenated Germany. So thanks to Herr Hitler we'll start to work and build a stronger, more effective air defense.

It now appears, six months after Munich when Hitler told the boys where to go, that we are to get some airplanes, new bases and increased personnel for our air forces. Of course, the savants haven't predicted yet who we are going to fight, or who might attack our shores, but it is a pretty satisfactory feeling to realize that the boys you and I elect to Congress finally admit the lesson they have learned about modern warfare in that air strength is not only the predominant and deciding factor and that through apathy and lack of foresight they have neglected to foster and develop a prosperous aviation industry. They know now that Washington in past years has placed practically every restriction and legal obstacle possible in the way of a young but important industry.

In spite of all the stumbling blocks and meagre appropriations the industry has grown. Prosperity, however, is yet to come. New capital is needed, then follows expansion and profits in orderly sequence. New capital will come when Washington sets out on a true compass course computed by navigators who know where they want to go.

Even now, during still critical hours, Washington blunders along without forming a national air policy. Leaders in the industry are concerned about hasty overexpansion that could be followed very easily by calamity. We have already experienced one such period of wild growth and subsequent wringing out, the sad memory of which is still fresh on the minds of those who suffered. Hence it is that long range planning in Washington is more desired right now than a hasty order for ten thousand first line fighting aircraft—intelligent planning that includes the creation of adequate research facilities; full utilization of every manufacturing element now in existence; immediate scaling up of air mail rate payments to domestic carriers and expansion of scheduled services to hundreds of communities now off the trunk lines; an airport construction program akin to the highway development program of the past ten years; modernization and wider application of aids to air navigation including the weather services; a broad plan of sympathetic encouragement to non-scheduled civil aviation; expansion of our military air reserves through utilization of current production types of aircraft and the present backlog of civilian personnel; and, of course, the steady procurement of military aircraft in the types and numbers commensurate with the requirements of adequacy in case of emergency.

The slow processes of democratic nations cannot hope to match the facility of totalitarian nations, who, with the stroke of a pen, can order up whatever they need in the way of factories, research laboratories, ground services, labor and other basic elements of air power. We must ponder, argue, study and chew our nails, like England and France.

We're just starting what should have been initiated by our government years ago—placing proper emphasis on the airplane as a necessary element and factor in our national security and economy. Streamlined totalitarianism finally has forced us to it. Congressmen are beginning to ask pertinent questions regarding production capacity of our factories, available labor and personnel and what type of research facilities we need to keep abreast, all of which leads us to believe they have at last thrown off their apthetic robes, come out of the woods, yawned, stretched and rubbed their eyes. It's been a rude awakening but thanks to Mr. Hitler, things are beginning to pop in these United States and it looks as though the airplane will soon come into its own, right in the very land that gave it birth.

Friend in Court

ABOUT the wisest and most encouraging move yet made by the new Private Flying Development Division of the C. A. A. is the appointment of representatives in various parts of the country. They are responsible only to Washington and are charged with the tremendous job of taking out the kinks in non-scheduled civil aviation within their respective geographical regions.

The southern half of the nation is particularly fortunate in the appointment of Ed C. (Pop) Nilson, who holds down the fort in Atlanta, and of Ralph DeVore, who is based in Fort Worth. So well known are these men to the flying fraternity that they need no introduction; so capable and well-rounded they are in the varied phases of private flying that it's practically assured they'll do a job the likes of which those of us in the game have never known.

Their job is not an easy one. We even expect that some of the folks they are to help most will be out to cut their throats, for unfortunately, that's the chief recipe in quite a few communities. However, we confidently predict that the majority of the non-scheduled civil aviation family will welcome them into the fold and work with them on the myriad of common problems that vitally affect the entire aviation picture. Their job is a constructive one, fact finding—not fault finding. Their express purpose and function is to make flying more profitable and safer, to get more people flying, in short to get more dollars into aviation—into your pockets. Whatever recommendations they send into Washington will carry weight, so it looks as though we at last have a "friend in court."

With the maturity and balance that comes from long years of experience, with the approach of "let's pull together and work out our problems in unison," and with freedom from Washington pressure and local politics, DeVore and Nilson should bring the dawn of a new day to private flying in the South and Southwest.

All they need now to get the job done is your help and cooperation. Without that there's very little use of a private flying development program or any other plan to alleviate present conditions and sore spots in non-scheduled aviation; for you can't help people who won't help themselves.

Lost Motion

WE WISH some diligent optimist would go to work and catalog the untold number of organizations professing interest in aviation. It wouldn't take much time to complete a listing of simon pure aeronautical bodies although there are quite a few of them and their membership is considerably greater than one would think. The big task would be a census of such elements as aviation committees in chambers of commerce, in national organizations and civic clubs. We hazard the opinion that the size of this latter list would be astounding.

Many of the uncounted thousands actually interested have never been inside an airplane; yet aviation seems to have a strange fascination for them and they are willing and eager to work on air projects. They represent a tremendous backlog of latent energy which, if turned loose in unified action, would do more than any other one potential factor in "making America first in the air." They represent the "average" American—the man in the street—and we need his help badly.

They might easily be rounded up into a cohesive group

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FROM THE FLOOR OF CONGRESS

"I AM deeply interested in the question of national defense, and I express the wish that some Congress prior to 1917 had given like consideration to our aviation needs. If that had been done, I might not today be speaking to you from a wheelchair.

"It seems to me that our air industry in many ways has been stifled. I had the opportunity just last December to go through one of the larger factories manufacturing airplane motors, and I want to say that I have nothing but praise for the men who are operating our aircraft industry and for the employees in our aircraft factories. You can go to any factory or any industry in the United States and you will not find a higher type of man than those who are turning out the aircraft that our Government and the world need.

"It seems to me that the hand of our own Government has been rather heavy on this industry. The gross profits have been limited under one act; the Wages and Hours Act has placed certain restrictions on the industry that have prevented young and enthusiastic engineers from devoting desirable time to the study of the problems affecting the aircraft industry. All of this raises the question of where the money is going to come from for necessary research in this industry. One of three things will happen. The industry must be given the opportunity to earn money to spend in research; the Government can provide that money, or we are going to drop behind the other nations of the world in the matter of aircraft and air-motor production."

—Representative William J. Miller, Connecticut.

The Eye That Sees Through Metal

Lockheed Aircraft Corporation Makes Most Extensive Industrial Application of X-Ray

By Homer Shannon

BALANCING of light structure against strength, or load-carrying capacity, is all there is to building airplanes, someone has said. Such a statement may be an over-simplification, but it serves to emphasize the importance of sound material in the structure of our finest transport planes.

It is not enough to know that the utmost care has been taken in the selection of materials and in its fabrication. External appearances are, at times, deceptive, as every small boy who has bitten into a sufficiently large assortment of shiny red apples knows. But the buyer of a Lockheed plane knows that he won't find a worm in his nice red apple. Experts at the factory have literally looked through every important stress part before it went into the plane's structure, with the aid of the most efficient eyes science has been able to devise—eyes which see into and through metal, searching out the smallest defects.

Pioneer Work

Using Triplett and Barton methods, the X-ray department at the factory of the Lockheed Airfcraft Corporation in Burbank, California, has done a vast amount of pioneer work in the application of this branch of metallurgical science to the manufacture of aircraft. At present, it is believed, a bigger job of this kind is being done at Lockheed than in connection with any other industrial application of the X-ray.

Something of the size of this job may be gathered from the fact that the routine of the department calls for X-ray examination of more than six hundred item-classifications on each type of plane manufactured. This means actual X-raying of a much larger number of parts for each plane produced, since there are multiple units of many of the item-classifications. In January of this year, the number of individual parts X-rayed by the department totalled in excess of ten thousand, and with increased production that was expected to be approximately doubled within a few months.

All parts going into the primary structure of the plane which are subjected to stress in service are 100 per cent X-rayed. That means that on a complex casting, for instance, radiographs are made from several different angles, to make sure that the check is complete. Stated another way, the interior structure of all parts, failure of which would cause grounding or failure of the machine as a whole, is thoroughly explored for hidden defects. Other parts, such as the holder for a fire extinguisher, the door latch and many similar ones are less thoroughly examined but do, none the less, come under the scrutiny of this searching eye.

Exactly the same principles are employed in X-raying metal parts or materials as are used by a doctor or dentist when looking for a broken bone or abcessed tooth, except that seeing into metal calls for more powerful equipment and many of the operations involve far more delicate laboratory techniques. It is also true that interpretation of the radiograph demands a great deal of highly specialized information on the part of the experts in charge.

In this connection, it should be pointed out that the apparatus in use at Lockheed is the only X-ray equipment in existence specifically designed for the aviation industry. It is the finest equipment of its kind and is among the most powerful in use for metallurgical work. The three X-ray machines at the Lockheed plant represent an investment of more than $150,000. Generally speaking, industrial X-ray equipment is an adaptation of equipment designed for medical use. With their special equipment, the experts at the Lockheed factory are able to obtain much finer detail of the interior structures examined than is possible with that in general use. The three machines, installed in as many carefully lead-lined rooms, are kept constantly busy, using direct current up to as much as 430,000 volts.

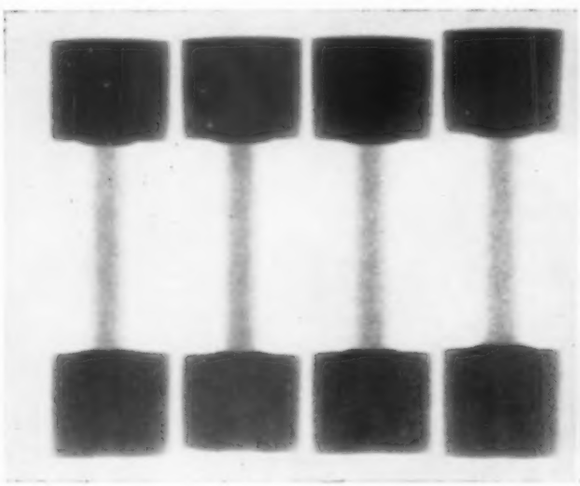

Fig. 1

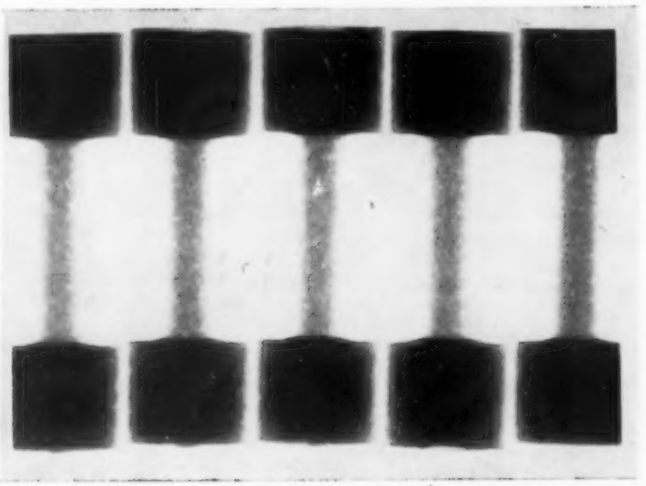

Fig. 2

Various degrees of shrink porosity are shown by the X-ray in these test bars cut from high strength Duralumin alloy castings. The first two bars in Fig. 1 were rated as good, withstanding a tension test of 35,000 pounds per square inch. All of the bars in Fig. 2 were rated bad, withstanding a tension test of 19,000 pounds per square inch.

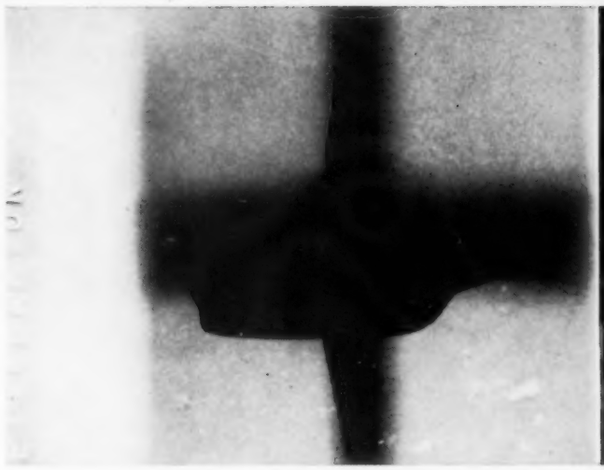

Fig. 3

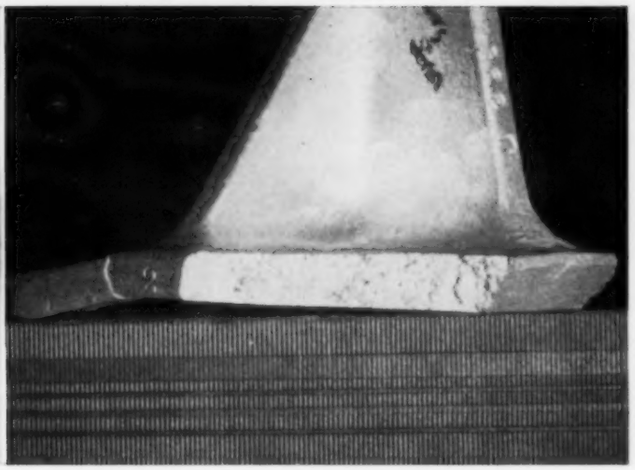

Fig. 4

Blow holes and shrink porosity are clearly shown in this radiograph of an alloy casting. Fig. 4 is the casting of which Fig. 3 is a radiograph, after being fractured to expose blow holes revealed by the X-ray. In the approximate longitudinal center of the fractured area, a blow hole can be seen which measured fully 3/10 of an inch in diameter.

Variety of Information

ORDINARY methods of testing materials involve destruction of the part tested, either through breakage, sectioning, or other mechanical or chemical operations. Such methods are of the nature of sample tests, assuming that the part examined is typical. Not only does the X-ray make it possible to examine the interior of the part which actually goes into the structure of the plane but the X-ray film is sensitive to properties of the material which are not easily observed by other means. For most purposes, the radiograph is relied upon to provide the desired check. For special purposes, however, it is possible to obtain information through the use of the X-ray which can be obtained in no other way. In analysis of fine structure, the X-ray goes far beyond the most powerful microscope, even down to the ultimate pattern of the atoms in space.

Except for special research problems, it is quite enough to examine the materials going through the department for such defects as blow holes, gas pockets, inclusions of foreign material, cracks, porosity, shrinkage, or segregation in alloys. The radiograph unerringly reveals all such variations in the regular structure, density or homogeneity of the material in question. With the special equipment in use at Lockheed, imperfections of a size not more than one-tenth of one per cent of the thickness of the material are readily detected. For all practical purposes smaller defects may be ignored. The grain flow of light alloy forgings and sections of steel forgings may also be revealed. It is equally possible to uncover stresses or undesirable modification in the internal structure of metal shapes produced by hydraulic press or drop hammer.

A measure of the efficiency of this type of testing is afforded by the fact that, to date, no X-rayed part has been known to fail in service. In the past there have been cases of repeated failure developing in a specific

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Fig. 5

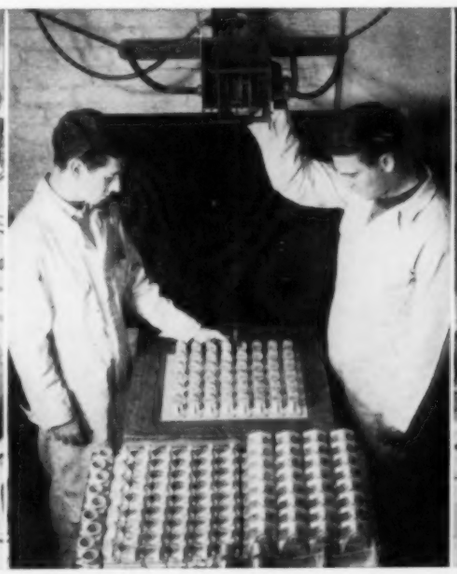


Fig. 6

Fig. 7

Triplett and Barton are shown in Fig. 5 examining a radiograph of a casting at the Lockheed plant. Fig. 6: Centering a setup of castings before exposure of film contained in holder under the parts. Fig. 7: A pneumatic tool (on bench) is used to stamp an identification number on each part as it comes into the X-ray laboratory.

THE ST. LOUIS NAA CONVENTION

Harmony, optimism, a varied program and announcements of steady growth and operations in the black combined to make the 1939 Convention the most successful in N. A. A. history.

SOMETHING new in aviation happened at St. Louis last month. It is unfortunate that every member of N. A. A. and every friend of aviation could not attend.

For those who were not there, however, this will describe what happened. For those who were there this will afford a digest of what occurred on all fronts.

We can tell you that more than a thousand persons attended the business sessions and social functions which began with the buffet supper Sunday night, January 15, and ended with the Convention Banquet Tuesday night.

We can tell you that approximately 400 persons journeyed from all parts of the country to attend the St. Louis meeting and that actual registrations neared 600.

But that doesn't begin to tell the story of the biggest achievement of the meeting. That was—harmony! From the time of the earliest informal groupings of officials and delegates there were numerous indications that a greater measure of harmony would be enjoyed than ever before the lot of a general aviation conference.

For once, key governmental figures in civil aviation, members of the military and navy establishments, manufacturers, marketers, exporters, air transport interest, fixed base operators, aviation schools, airport managers and the non-professional aviation enthusiasts all were able to find common focal points for their individual approaches to the ramified problems of the industry.

It was evident from the outset that the Committee on Arrangements under the brilliant chairmanship of George B. Logan, district vice-president and N. A. A. governor for Missouri, had set the stage in a manner befitting the accomplishments to follow.

Earlier on Sunday a meeting of the Missouri Department was held and under the leadership of Mr. Logan and Robt. R. Lester, president of the Kansas City Chapter, plans were completed for the establishment of a State N. A. A. Department.

ON MONDAY morning the convention convened under the chairmanship of President Horner and Mr. Logan, the temporary chairman. The call for convention was read by William R. Enyart, secretary, and Hon. Bernard F. Dickmann, mayor of St. Louis, delivered his address of welcome.

Following the reading of Rules of Procedure and the appointment of convention committees, Col. John H. Jouett, treasurer, delivered his report. This constituted one of the high lights of the convention because of the significant fact that N. A. A. had during the past year not only liquidated an onerous burden of debt but had managed to show a cash balance at the end of 1938 along with the achievement of a great program and a tremendous increase in both senior and junior chapters.

The N. A. A. Youth Program session under the direction of Mr. Enyart drew considerable interest on all fronts, particularly in view of the government's announced program looking towards the training of 100,000 pilots and 125,000 aviation mechanics during the next five years.

Ernest Gamache, research director for Air Youth of America, gave the preliminary findings of the survey of the Rockefeller committee under the direction of Winthrop Rockefeller.

Ralph Waterhouse, superintendent of schools, Akron, Ohio, talked on the value of aviation education from the viewpoint of the schools.

The last speaker on this program was J. W. Vail, education director of TWA, who told of the remarkable accomplishments of Air Scout Troop No. 1 of Kansas City.

THE final session of the morning was devoted to private flying and Harry K. Coffey, district vice-president for the Ninth District and N. A. A. governor for Oregon, served as chairman. Moss Patterson of Oklahoma City did some straight talking about the whole confused field of private flying and non-scheduled operations. He expressed the opinion that one of the greatest drawbacks to the expansion of private flying activities has been the expense involved. He urged that the government assist various agencies in the development of research programs designed to make available safer and cheaper aircraft for private owner use and that the government develop a plan whereby federal funds would participate in the establishment of off-line airports.

Pointing to the British Civil Air Guard which he believed was aiding the march of flying in that country, Mr. Patterson urged that our government make it possible for private owner pilots meeting reasonable physical and educational standards to become flying members of a large military air reserve force. He also gave his hearty endorsement to the conclusion as arrived at by Mr. Enyart in his recent analysis of the problem published in *National Aeronautics.*

Grove Webster, chief of the Private Flying Development Division of the C. A. A., was unable to attend as originally scheduled, so Mr. Enyart outlined for Mr. Webster the general program and activities of the C. A. A. in that direction.

One of the great old-timers of aviation served as toastmaster at the luncheon on Monday. He was Major Jimmie Doolittle. His broad smile and ready wit came as a refreshing stimulant after the morning's work.

CHIEF speaker at the luncheon was Oswald Ryan, legal light of the C. A. A. Member Ryan's enthusiasm was contagious. In the friendly atmosphere, he departed from his prepared remarks and was acclaimed with thundering waves of applause.

Stressing the vital importance of aviation to our national welfare in peace and its indispensability in war he declared:

"The Munich Conference has taught the world that air supremacy today vitally influences national destiny."

These factors, accurately envisaged by Congress in framing the Civil Aeronautics Law, he said, lead to the thought that the nation's welfare in peacetime and safety in wartime rest upon the presence of stabilized aircraft production; sound commercial air transport; an adequate

(Continued on Page 16)

Instruments for Instrument Landings

This paper traces the history of instrument landing from the standpoint of instrumentation. No specific system is discussed in detail but instruments are referred to in relation to the problem of conveying to the pilot information conerning motion in six axes. The steps leading up to the development of a combined indicator are outlined. Reference is made to automatic landing and the adaptability of the combined indicator as a monitor is discussed.

J. Lyman and F. L. Moseley
Sperry Gyroscope Company

PART II

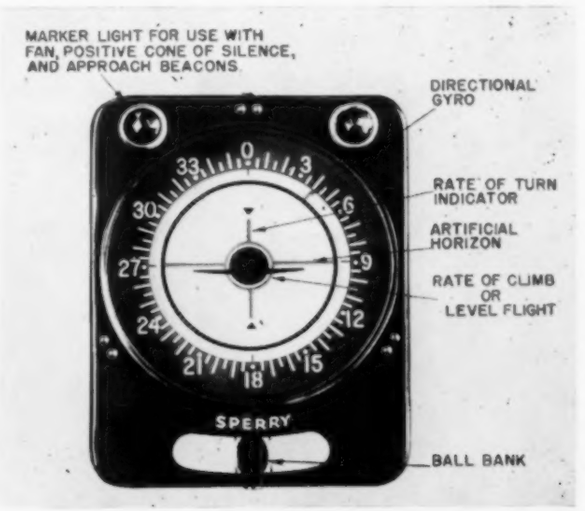
HAVING discussed at some length the early developments in the field of instrument landing and the types of information and instruments essential for this work, it would now be well to see how far the art has progressed to date. We find that development has extended generally along the lines laid down in the earlier work. A greater number of different groups of people has been engaged in the work and development has expanded in different directions. As time has gone on, however, it has been increasingly obvious that the interests of the industry could best be served by concentrating endeavor along definite and well established lines. Accordingly a set of specifications for instrument landing ground equipment has been drawn up and agreed to by a number of important agencies interested in the development of instrument landings. These specifications, known as the Radio Technical Committee for Aeronautics specifications, lay down definite requirements of a uniform instrument landing system. A number of installations of systems meeting the requirements are rapidly going forward at strategic airports and will be used for pilot training and further experiments, before being put into actual operation on regular airline schedules.

The development leading up to the formulation of the above standard specifications has largely been one of improving the radio end of the system, extension of the use of the automatic pilot, and increasing the ease of instrument interpretation. Radio development has more and more tended toward the ultra high frequencies. Here, effects of atmospheric disturbances are at a minimum and directional antennas assume reasonable proportions. With a shift of frequencies from the low to the very high has also come a general increase in range, sensitivity of indication and smoothness of courses, both in the vertical and horizontal. The glide path in some systems has been combined with the localizer. Marker beacons have become simpler and at the same time better defined. Equipment for ground monitoring of the system, which was quite lacking in early experiments, has been brought to a point where it is a necessary and specific adjunct to all installations.

The R. T. C. A. specifications for instrument landing, under the heading of "projected development," contain reference to the use of the automatic pilot. This serves to indicate that much work has gone on in this connection since the work of 1928-29. The quotation from the specifications is interesting: "The equipment provided should be so designed as to facilitate possible ultimate utilization (with accessories) in a fully automatic landing system in conjunction with a gyropilot."

In the realm of instruments alone we find that development work has, of necessity, been so concentrated upon the ground systems that little has been done. The vibrating reed has given place to the crossed pointer, gyro equipment has been made more accurate and reliable but is essentially the same as it was; the altimeter and marker indications have changed very little. A better understanding of the fundamental principles, however, has contributed toward a standard dashboard arrangement, concentrating the important flight information in a suitable position. Some attention has been directed toward combining indications as evidenced by the Lorenz marker, glide path and localizer indicator.

SINCE the beginning of serious attempts at instrument landings the problem of the proper method of *indicating* to the pilot his position and attitude has always been a difficult and vexing one. The report on the Guggenheim Fund's instrument landing work contains several references to this difficulty which are worth quoting. In one place the report says, "The next great difficulty in



SPERRY FLIGHTRAY

When used as a flight instrument, the Flightray shows on one dial:

1. **The directional gyro**
2. **The artificial horizon**
3. **The turn indicator**
4. **The ball bank indicator**
5. **Cruising altitude**

This photograph shows the manner in which these indications are portrayed. The horizon indications are shown in the conventional manner. The rate of turn is shown by side-to-side movements of the vertical bar. A normal or standard turn is indicated when the bar is maintained at the wing tips of the miniature airplane. When the instrument is set to shown level flight at cruising altitude, the desired altitude is selected and so long as the airplane is at that altitude, the concentric circle encloses the miniature airplane. The position of the circle thus indicates positions above or below the desired altitude. A selector switch is provided to change the instrument from flight indications to landing indications. As an instrument repeater, the Flightray may be used simultaneously in several locations.

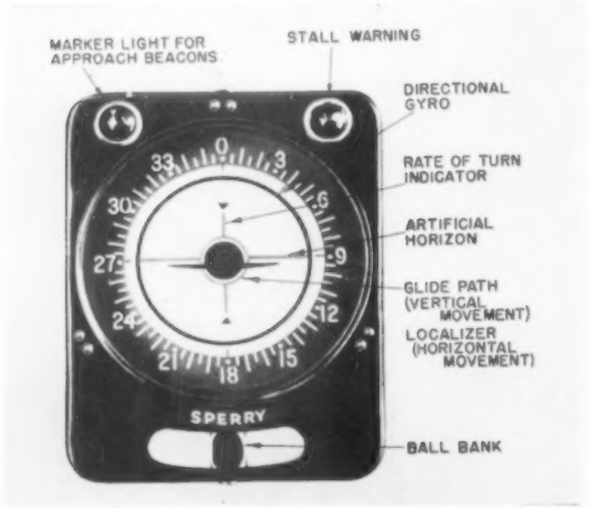
landing was the necessity of watching and analyzing a number of things. The human mind is capable of reacting to only so many things at a time." And again in the Fund's discussion of the location of instruments on the dashboard we find the following remark, "It is quite impossible, especially in bumpy weather, to maintain any desired course even with a suitable airplane, if the essential instruments are promiscuously located." And again, "The ideal attitude indicating instrument for airplane use is one that shows a miniature three-dimensional airplane integral with the airplane itself in relation to a miniature three-dimensional space, the bottom plane of which remains parallel always with the true horizon. . . . The poorest scheme of all is the use of an indicating hand."

Thus condemned the indicating hand has little to recommend it. Yet this same indicating hand has had to be tolerated for a good many years for lack of anything better. The ideal three-dimensional space indicating mechanism is still far from practicable and one wonders, even if it existed, whether it would be of great value. The next best scheme would seem to be to present a two dimensional picture. But then again the problem becomes confused as to just how far this picture idea should be carried. There are a number of schemes of one sort or another which aim to show on a screen a picture of the territory in front of the aircraft which is about to make a landing. Let us see what experiments are being made in this direction.

One of the first thoughts along the line of pictorial representation of aircraft position and attitude was a radio scanning device patented by the General Electric Company. So far as is known this device has not been commercialized but since it represents one of the early attempts at the picture type of indicator it may be taken as a good example of this class of instrument. The scheme is, briefly, to scan an area directly in front of an aircraft by means of a radio beam and to show the result of this scanning on a cathode ray tube face. If then, radio transmitters were placed about the boundaries of an air field, their relative location would be shown on the screen and the pilot would see before him a pattern of familiar landmarks directly related to the airport layout as seen under good visibility conditions.

Another system of this general nature is one proposed by Irving Metcalf of the Bureau of Air Commerce. This has often been referred to as the three-spot system because three spots are shown on a screen in the cockpit, the three spots indicating the relative position of three radio transmitters located on an airport and arranged in a definite manner. One of these transmitters would be at the far end of the runway, and the other two on poles above the ground at a predetermined distance and somewhat in front of the first. These three transmitters when directionally or panoramically received and reproduced on the screen of a cathode ray tube define a reference plane in space, both in the vertical and horizontal. In order to eliminate the complications of three ground transmitters an instrument is now being tried which makes use of the artificial horizon as a substitute for the two side transmitters.

Development work on this device is under way at the Massachusetts Institute of Technology, and includes research work on an ultra-high frequency straight line guide path. In this connection it is interesting to note that the projection of a straight glide path by double modulation or keying in the vertical plane is again being revived, after having been abandoned by Diamond and Dunmore in 1928 in favor of the equi-signal curved path.



SPERRY FLIGHTRAY

When used as a landing instrument, the Flightray shows on one dial:

1. Directional gyro
2. Artificial horizon
3. The turn indicator
4. Glide path
5. Runway localizer
6. Ball bank
7. Marker light signals
8. Minimum air speed (stall) warning

This photograph shows the manner in which these indications are portrayed. The directional gyro, artificial horizon and rate of turn indications are the same as for the flight setting. The circle surrounding the miniature airplane fuselage indicates position with respect to glide path by its vertical motions and with respect to the runway localizer by its horizontal motions. The miniature airplane is flown up or down, right or left to keep the real airplane in the glide path and runway localizer. Fore-and-aft and lateral attitude of the ship is controlled by flying the miniature airplane with respect to the horizon bar in the usual manner.

The outer and inner marker signals are shown by the lighting of the green light in the upper left corner of the instrument case. Minimum safe air speed or stall warning is given by flashing of the red light in the upper right corner.

A selector which is provided to change the instrument from flight indications to landing indications. As an instrument repeater, the Flightray may be used simultaneously in several locations.

THE Sperry Gyroscope Company has been active in the field of instrument landing since its very beginning and it is only natural to find this company still much interested in many of the problems involved. Although the company's first interest has been the gyroscopic instruments used in flight and landing, it is not considered inconsistent that its present work extends beyond the gyroscopes themselves to include radio indications. The company has felt for some time that any contribution towards assembly and co-ordination of flight instruments would be worth while. With this in mind, development work has been going forward during the past two years on the construction of an experimental combined flight indicator, which assembles in a simple pattern what might be called the *immediate* flight information.

The title, "cathode ray multiple flight indicator" having proven itself rather unwieldy, we have named this experimental instrument the "Flightray."

The instrument simultaneously indicates to the pilot his position relative to the glide path and localizer, his heading by directional gyro, his attitude by artificial horizon, and his rate of turn. Conveniently placed on the same mounting are signal lights for the inner and outer marker, and a ball bank indicator.

The instrument on which the various indications are combined is the florescent screen of a 3 inch cathode ray tube. Patterns as desired are drawn on this face by electrical deflection of an electron beam within the tube. Deflection voltages are picked up by a vacuum tube system associated with each of the instruments. By means of an electronic switching system involving no moving parts, these instruments indications are placed on the screen in rapid sequence, at a speed well above the per-

sistence of vision. Thus the complete pattern appears in a steady and flickerless manner, permitting the simultaneous observation of the major instruments used during landing.

Two face arrangements are currently being tried out. In the first a miniature airplane fuselage in the center of the screen is flown with respect to the horizon just as in the usual gyro-horizon instrument. The horizon line extends across the instrument face, and moves in exact synchronism with the real horizon, invisible to the pilot. The directional gyro heading is shown by the movement of a small radial line moving on an azimuth scale around the circumference of the face. Rate of turn is shown by side to side movement of a vertical line, and is sensed the same as the usual turn indicator. That is, a standard turn to the right is indicated by movement of the bar to the right until it reaches the wing tip of the miniature airplane.

At one stage of the investigation it was thought desirable to have an indication of radio compass heading and for this purpose the turn bar was removed from the turn indicator and switched over to the compass right-left meter circuits. This scheme has since been abandoned primarily because the landing systems currently under way do not include a transmitter suitable for use with existing types of radio compasses.

POSITION of the real airplane on the glide path and localizer is shown by the relative position of a circle normally surrounding the fuselage of the miniature airplane. The sensing of this indication may be changed as desired, but in our flight tests we have indicated a position above and to the right of the glide path by a position of the circle down and to the left. The reason for choosing this sensing was in order to have the miniature airplane flown by the pilot in reference to the glide paths just as it is flown in reference to the horizon. Thus with the plane moving above the horizon, we find ourselves climbing above the glide path.

In a series of flight tests at Indianapolis last year, we found this arrangement a natural one, particularly for use in a combined attitude and position indicator such as this, where different sensing for different indications might be very confusing.

When this instrument is used for route flying with no need for the glide path and localizer indications, the indication of the circle moving in the vertical is retained, and transferred to the altimeter, as a zero-reader. The pilot may set the altimeter to any desired cruising level, and so long as this altitude is maintained the circle will remain centered on the fuselage. Deviation from selected altitude will be shown by relative movement of the miniature airplane and circle.

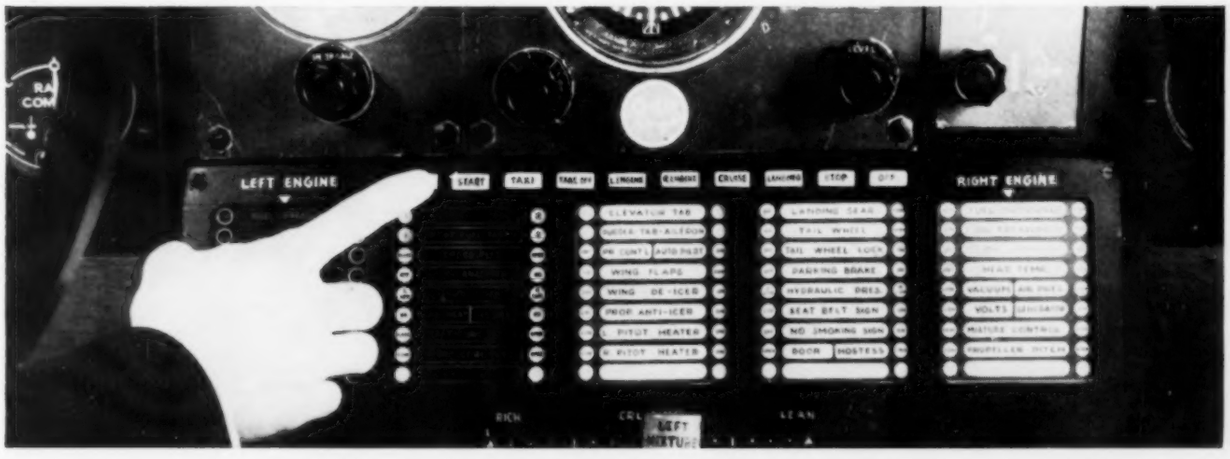
A revised face arrangement is being tested. Here the directional gyro has been shown as a zero-reader, to be set to the runway course early in the landing procedure. This possesses the advantage of symmetry of indication, but is rather difficult to use during orientation maneuvers before the localizer has been picked up.

Experiments have been conducted using the circle as a rate of climb indicator, and thus in this modification, the combined indicator would be well adapted to the Army constant rate of descent system.

The gyro equipment is contained in the central panel of a shock mounted box. Pick-up and commutation equipment is situated directly above and power supply below. A control box is provided for the pilot from which he may case and set the directional gyro, adjust the pattern brilliance, select the flight or landing position, and set in any desired cruising altitude.

In using the Flightray on a regular route through to an instrument landing, the entire flight picture, including cruising altitude, is presented to the pilot in a simple and readily interpreted pattern. As the landing is approached, the glide path intersection altitude, say 1500 feet, is set into the Flightray altitmeter, the ship brought to this altitude and flown to the outer marker, at which point the control box switch is set to "land." The glide path and localizer are then followed, on the same circle and using the same sensing as obtained in flight, until ground contact is established. It is thus seen to be unnecessary to transfer attention to a new set of instruments in order to effect a landing.

IN OUR opinion, a most useful flight indication would be made available if it were possible to have a visual course system indicating on the right-left motion of the



NEW EYES FOR THE AIR LINE PILOT

One of the many innovations incorporated in the Curtiss-Wright CW-20 transport is this "Tell-Tale" signal system which automatically checks the functioning of all instruments and vital parts of the airplane, simplifying the pilot's work and further minimizing pilot fatigue.

The pilot presses a pre-selector switch corresponding to whatever operation he requires and a battery of lights on the "Tell-Tale" panel immediately indicates any necessary controls or instruments which must be adjusted. As the latter are properly manipulated, their corresponding lights flash out and a dark panel indicates proper functioning. Any malfunctioning of the aircraft's vital parts or controls is thus immediately indicated for readjustment. The system covers 47 details from engine temperature to whether the stewardess shut the passenger cabin door. If the pilot wishes to land, he simply presses one of the 10 pre-selector switches marked "land." Lights immediately show on the panel to indicate what adjustments are necessary. As the landing gear is lowered, that light goes out, with similar operations such as lowering flaps, trimming tabs, cutting engines and all other control details until the panel is dark. The panel checks for taxiing, take-off, cruising and landing, and further enables the pilots to quickly check on proper functioning of each engine.

circle, as is done on the field localizer. With the present trend toward high frequency ranges, it may be found possible to install a modulation system which would combine visual course indication with a keyed A—N system.

While the combined indicator just described was primarily designed to fit the usual landing systems covered under the R. T. C. A. specifications, it is probable that it could have a very valuable place in an automatic landing system of the future.

Ever since the early work of the Guggenheim Fund and the Bureau of Standards the automatic pilot has appeared more and more often in instrument landing experiments. Although perhaps not usually expressed in quite this way it is likely that the thought has been "if the human mind has difficulty in absorbing and interpreting many things, perhaps it would be better to let the robot mind take over." And in fact it may be so. The automatic pilot has its thinking processes pre-set along narrow channels, and if allowed to do the work assigned to it, there is little doubt that it can act on information supplied to it with a facility, promptitude and accuracy which the human mind and muscles could not hope to duplicate.

In all experiments where the automatic pilot has been used, notably the Army's and United Air Lines—Bendix, it has given an effective performance. In the Army experiments the automatic pilot took complete control of the airplane and no human hand was required except to turn the control over to the automatic pilot and to take it away after the landing was completed. In the U. A. L.-Bendix projects the automatic pilot took charge of the attitude of the airplane, no small task in itself, leaving the human pilot entirely free to assemble and act upon position information. Future experiments will no doubt determine the feasibility of a fully automatic landing system, but in any event it is safe to say that no system would be permitted to land a transport plane unsupervised, and it is this supervision which could most easily be accomplished by observation of a combined attitude and position indicator such as the one described.

In reviewing the history of instrument landing—one now finds nearly all the problems have been solved. Scheduled air transportation will soon be making landings under conditions of zero visibility. But development work does not cease there. Each part of the entire system must go through a constant process of refinement and simplification.

Eye That Sees Through Metal

(Continued from Page 7)

part; but with subjection of such a part to routine X-ray examination all such failures abruptly came to an end.

IN ADDITION to supplying positive assurance that all materials going into a plane are sound, a substantial saving in manufacturing is effected through use of the X-ray. Machining or other fabrication of materials which might develop defects is eliminated. Machining of a casting which has not been X-rayed may open up imperfections in the internal structure only after a large amount of work has been done. If the X-ray is used before the casting goes into the machine-shop such unnecessary waste is avoided. Further, the X-ray makes it possible to know with certainty that areas of the casting not opened up by machining are sound. The X-ray gives a rapid and the only complete check on interior structure.

Another extremely important contribution of this comparatively new tool to the aviation industry has to do with development of parts of new or changed design. It has repeatedly proven invaluable in the correction of foundry or forging techniques for the elimination of defects which would have been otherwise much less easily detected—possibly detected only after a disastrous failure in service.

Work of the Lockheed X-ray department includes the regular checking of sheet alloys, tubing, bar material and steel stock as well as the individual shaped parts. The range of the materials tested includes, besides the various metals, wood, rubber, plastic, wire insulation, paints, and numerous others.

There are, in addition, a variety of special services performed by the department. A salesman may appear at the plant with a new material or special application of an old one which he contends is superior to that being used. An X-ray analysis of his sample will frequently give conclusive information as to the correctness of the contrary of his claims.

The special techniques developed by Triplett and Barton make it possible to know the exact performance which may be expected from any given material or airplane part. Exhaustive studies carried out by these two metallurgical experts and others have resulted in well-established standards correlating the information revealed by the radiograph with physical performance.

THE LOCKHEED XP-38

Delivered in February to the Army Air Corps for tests, this single place, low wing monoplane with a twin boom tail and enclosed cockpit crossed the continent in 7 hours, 45 minutes elapsed time, including stops for fuel at Amarillo, Texas, and Dayton, Ohio, with Lt. Benjamin S. Kelsey at the controls. Coming in for a landing at Mitchell Field, New York, Kelsey undershot and gunned his Allison 1,000 V-12 engines, one of which died, thereby forcing him into a tree on a near-by golf course. Kelsey was unhurt but the XP-38 suffered severe damage. (Official photo, U. S. Army Air Corps.)

Note: Mr. Lyman's and Mr. Moseley's article was based on a paper presented at the recent Air Transport Meeting of the Institute of the Aeronautical Sciences in Chicago.

Dear Steve:

All communications published under this head must be signed by the actual name of the writer. The editor is not responsible for the opinions expressed, but reserves the right to exercise discretion as to what shall be published. Letters must ordinarily not exceed 1,000 words.

★

Over in Shreveport we all got together and agreed that the non-scheduled part of the industry was well on the way to being regulated to extinction—or at least decimated—unless we got together and voiced our ideas as a unit, on what we think is necessary and desirable. We agreed to meet in March in Fort Worth with plans and ideas, and with unified strength to give them voice.

For the first time since the Air Commerce Act of 1926 was enacted non-scheduled aviation has a friend at Washington. Grove Webster has his heart in his job of seeing this part of the industry come into its own, and all he needs is the consolidation of the entire private flying fraternity to get solidly behind him and let him know what is needed. All of us, pilots, mechanics, school operators, fixed base operators, manufacturers, private and corporate airplane owners, all who use the airplane for transportation or pleasure, have to get together and correlate our ideas into sound and constructive suggestions for his guidance. If we persist in uttering isolated individual squawks that "all is haywire," without concerted efforts to better things, we're going to find ourselves running around as the despised illegitimate cousin of the great Air Transport Industry.

Some 900 pilots and 400 airplanes set the rules for 20,000 pilots, 40,000 student pilots and 10,000 airplanes. And 25 officials in Washington can outvoice Grove Webster. I well know the contributions in design, safety and speed that the transport industry has given the industry, and their organizing into coherent units was for their own preservation, not against us. If we do the same we can accomplish our ends without hurt to them, and with benefit to all.

My own interests are, of necessity, concerned with the maintenance end, but this is the end which costs the private owner. I think there are a number of changes in the C. A. R. that could be made with advantage to all.

The matter of addition or removal of extra equipment has insidiously become the bugbear of all types of repair agencies. After we try to do a good, safe, workmanlike job then we have to make up a Form 18-1 describing what we did, how we did it, how much it weighed, the horizontal arm, etc., etc., and then swear before a notary as to whether we told the truth. Why the notary business on every piece of paper? If we lied about it the inspector would find it out, our customer would find it out, and we would soon be out of business. Besides the notary fee of four bits—for duplicates. In an average private airplane that four bits represents roughly 30 miles. In the last year I have made nearly 200 of these forms. This means 6,000 miles my customers have paid for—but didn't get.

If it so happens that the equipment in question is not in the Specifications then it is necessary to make up a Weight and Balance report, if the data can be obtained, or weigh the airplane and compute new C. G. locations for the empty, noseheavy and tailheavy loaded conditions. Now the Specifications are only sent to the C. A. A. inspectors, and if none happen to be in town then you must spend days, or weeks getting the information necessary to start the job. Then if it should be found necessary to weigh the airplane a C. A. A. inspector *must* witness the weighing. In one instance in Dallas we had to wait nine days for an inspector to witness the weighing—after installing 26 lbs. of radio equipment in the conventional location in a 3750 lb. airplane. All of this business takes time, delays the owners, and costs money. In the case mentioned above the cost and delay have caused an owner, who used his own airplane for transportation for nine years, to sell his ship and quit. That means a loss to me of a good customer and a loss to the industry of an enthusiastic supporter. This state of affairs is the more pitiable, because it is so very useless and unnecessary.

I think I have a solution to this weight and balance business. When the ship is manufactured it has been weighed and the empty weight and C. G. is known as are the noseheavy and tailheavy C. G. with load. The fore and aft C. G. limits are established by the A. T. C. tests. Note these four items of information *on the license* and then allow the addition of *any* kind of equipment *anywhere* in the airplane so long as the gross weight and C. G. limits are not exceeded. The C. A. A. inspector can tell if an installation is airworthy or not, so let him judge that.

I challenge the fact that the 63 pound addition of a nationally known radio is less dangerous to the stability of a certain airplane than is a 26 pound radio made locally. Yet the former is optional while the installation of the latter required a Weight and Balance Report—at a cost of $15.00 to the owner. That cost and one day's delay didn't make him any happier about the whole thing.

It might be that the Inspectors might welcome some method of lightening the load of ponderous tomes they have to carry with them. One more year like the last and they will have to have caddies to carry their brief (?) cases.

The author of C. A. R. 18 has given but little consideration to the difference between any itinerant mechanic and an Approved Repair Station. The Station has had to meet rigid requirements as to equipment, personnel, and parts stock. It is logical to assume that they are not going to jeopardize their investment by unairworthy work or questionable actions. They should be relieved of the load of paper work and the need of calling an inspector for every item. If they are not competent and conscientious their certificate could be revoked.

The only repair that must be done by an Approved Station is on a damaged propeller. I think that all major repairs should be made in an Approved Repair Station. Those Stations now not approved will not resist this move if they are capable and have the proper equipment. And if they are not they should not attempt the work. I make this recommendation from the standpoint of safety, for I do not think it conducive to the utmost safety which we all are seeking, that any itinerant mechanic be allowed to make major repairs to landing gears, structural fittings, engines, instruments or radio unless he has demonstrated his ability and has the proper equipment. I think I am right about this because I have patched Jenny wings with muslin and shellac, overhauled Hissos in a cotton house, and cut the good end off an Ox toothpick to balance it—but I wouldn't do it now. It is required of all airlines that their repair bases be approved, and with the extension of non-scheduled aviation into instrument flying, high speed and fine equipment it follows that our practices must keep pace with the rapid advancements being made.

A study of C. A. R. 52 impels the thought that this chapter should be rewritten by someone with practical experience in all phases of mechanical work. Some of the classifications, particularly that covering the approval for instruments, are very poorly done. It is inadequate for present day needs, and some of the requirements are absurd. A Veedor liquid tachometer—value $600—is noted, though there are later and cheaper methods, but nothing on electrical or gyro instruments. In the section covering engine overhaul, means of inspection by magnetic dust method of ferro-magnetic parts is omitted, yet it is conceded that this method has done more to establish power plant safety than any development in years.

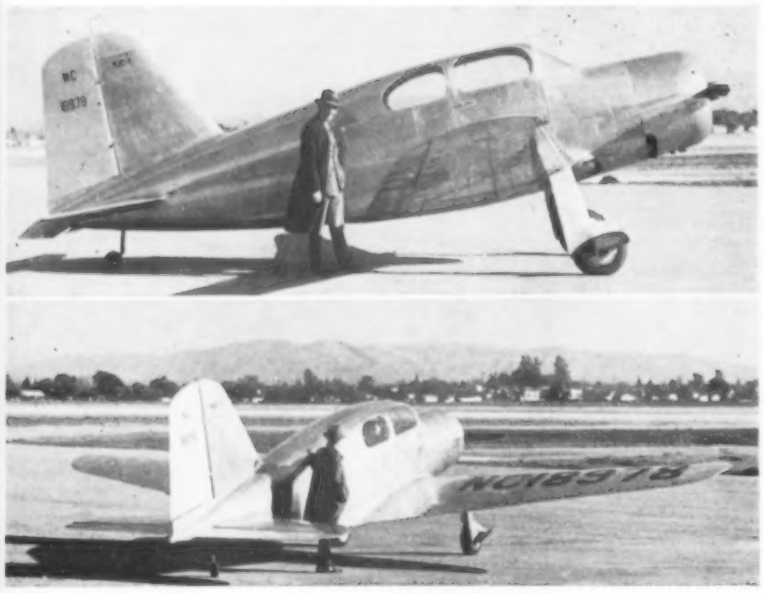
I believe that many of the inadequacies and difficulties that we now encounter could be eliminated if those divisions of the C. A. A. having to do with mechanics and maintenance could be placed under the supervision of a man who has had thorough practical experience in maintenance, not only airlines, but on non-scheduled equipment so that he will be familiar with the economic side as well as the great diversification of equipment that he obtains in the latter field. If one who has had only airline experience dominates the maintenance end, then we will have all problems viewed from the standpoint of large metal airplanes, and high output engines. But for the good of all it must be remembered that we also have our puddle jumpers and cotton dusters. The idea has precedent in that in engineering we have an engineer, for airports we have a man who has spent years developing airports, for pilots we have many excellent pilots, so why not have a mechanic handling the mechanical end?

Yours,
Frank Say

Dallas, Texas
Feb. 1, 1939

This is the first of a series of letters answering the pertinent question: "What's wrong with the C. A. R.?"

New Equipment Review



HARLOW PJC-1

(See Front Cover)

AFTER three years of intensive development and testing, the Harlow Engineering Corporation has announced completion of their low-wing, all-metal cabin monoplane of semi-monocoque construction, designated as the PJC-1. Approved Type Certificate No. 659 has been awarded the airplane by the Bureau of Air Commerce. The corporation has established a factory, operating as the Harlow Aircraft Company, on Alhambra airport near Los Angeles and is now tooling up for production of the 2—4 place model for the private aircraft market.

The PJC-1 was designed by Max B. Harlow, general manager of the new concern and veteran aircraft engineer who was a project engineer connected with the Hughes Aircraft Company during the building of Hughes' record breaking speed plane. J. B. Alexander, who also was formerly associated with Howard Hughes and one time sales manager for Ryan Aeronautical, is president. John C. (Jack) Kelly, veteran pilot-salesman for many years with the Stinson Aircraft Corporation and for the past two years interested in a design of his own on the West Coast, is vice president in charge of sales.

Powered with the 145 horsepower Super Scarab series 50 Warner engine, the new design boasts a cruising speed of 160 miles an hour at optimum altitude, a landing speed of 48 miles per hour and a full load range of 600 miles, according to figures released by the company. Gasoline consumption is nine and one-half gallons per hour at cruising.

Officials pointed out that use of the continuous wing, which eliminates the center section with its costly fittings, effects considerable savings in manufacturing costs. In addition, wing tips are removable. Other features include retractable landing gear and flaps, electrically operated; complete sound proofing; and luxurious cabin interior for greater passenger comfort.

The Warner engine is equipped with dual Scintilla Magneto, Stromberg carburetor, engine driven generator and Eclipse Electric starter. A 12 volt storage battery is located under the motor cowl and is easily accessible. The three piece sealed cowling is removable in 2 minutes. The firewall is of stainless steel.

The landing gear is fully retractable and electrically operated. When retracted the entire gear is completely enclosed in the wings. The landing gear is positive in action and locks on dead center in both up and down position. The gear is fully retracted or lowered in six seconds. It can also be operated manually in 1 1-2 minutes. The under carriage is fitted with Oleo hydraulic shock struts to insure soft and cushioned landings.

The flaps, which are of the split type, are located at the trailing edge of the wing and are so situated as to prevent any interference or blanketing of ailerons or tail group. The flaps are electrically operated, may be stopped at any desired position, and have a maximum travel of 45 degrees.

The 21 inch landing gear tires are of semi-low pressure type. The streamlined tail wheel, of Harlow design, is either steerable or lockable and turns 360 degrees—all automatic. The hydraulic brakes are of the disc type for eliminating grabbing. They are actuated by applying pressure to the upper part of the left and right rudder pedals.

A thirty-five gallon fuel tank is located in the wing and a four gallon oil tank is located in the motor compartment. Both tanks are built of heavy guage aluminum and are amply baffled. Fuel lines are built and routed to meet airline requirements and specifications. All valves are brass, cadmium-plated.

Instruments included as standard equipment consist of: compass, altimeter, tachometer, airspeed indicator, rate of climb, bank and turn indicator, and oil temperature, oil pressure and fuel pressure guages. The instrument panel is indirectly lighted and mounted on rubber to dampen vibration and reduce maintenance cost.

Standard equipment consists of dual wheel control, arm rests, dome light, assist grips, ash trays, glove compartment, map pocket, and cigar lighter. The seats and seat backs, ceilings and side walls are upholstered in Pullman cloth lending both beauty and durability to the cabin interior. Instrument panel and window moldings are finished to harmonize with the cabin.

Cabin ventilation is provided by bringing fresh, fume-free air, from the leading edges of the wings through conduits to the cabin. This supplies ventilation allowing the windows to be kept closed giving maximum ventilation with noise reduced to a minimum. Fresh air is warmed without danger of picking up gas fumes by passing it through an intensifier tube in the exhaust stack. The volume of air is controlled from the instrument panel. An even temperature can be maintained in sub-zero weather.

SPECIFICATIONS AND WEIGHTS

Top Speed	170 mph
Cruising Speed	160 mph
Landing Speed	48 mph
Cruising Range (Optimum altitude)	600 miles
Landing run with Electric Flaps	240 feet
Climb	900 ft. per min.
Service Ceiling	13,400 feet
Span	35′ 9″
Length	23′ 2″
Height	7′ 6″
Empty Weight	1531 lbs.
Gross Weight	2600 lbs.
Useful Load	1069 lbs.

AERO I. T. I. SAILPLANE

A HIGH wing, semi-cantilever sailplane with unusual design features is now under construction at Aero I. T. I., Los Angeles. The design was completed by engineering students, and all parts are being made by students in master mechanics courses.

Wings of the sailplane do not follow the orthodox design, with ribs perpendicular to the spar, but have the ribs set at an angle. This results in the appearance of geodetic construction and gives greater strength at lower weight. The wings are fabric covered, and the fuselage is all metal.

Another interesting feature is the wing flap design, never before used on a sailplane. The flap and ailerons are so rigged that when the flap is lowered, the aileron is also lowered, to a proportionately smaller degree. This design is expected to capture the most efficiency from a thermal.

Specificiations of the new plane are: wing span, 578″; wing area, 170 sq. in.; wing loading, 2.65 lbs. per sq. in.; airfoil, 23012.7; aspect ratio, 13.6; estimated stalling speed 28 m.p.h.; estimated weight, 450 lbs.

ROTARY WINDSHIELD CLEANER

AIR Associates recently have developed and perfected an interesting rotary windshield cleaner designed for aviation use. It is electrically operated and has a special de-icing fluid attachment. Rigid tests in all kinds of weather under difficult flying conditions have proved the dependability and efficiency of this new product.

The cleaning action of the wiper comes from a revolving blade. Driven by a flexible shaft from a small electric motor, the wiper blade rotates at any desired speed up to 2500 R.P.M. The driving shaft passes through a hole in the glass and carries the blade. The driving head is mounted directly on the windshield and always maintains the correct position of the blade in relation to the windshield surface. The pressure of the blade against the windshield is adjustable.

The wiping edge of the blade is made from a material especially developed for this purpose. This material is unaffected by oil, gasoline, sunlight or extreme temperatures.

Speed of the rotary windshield cleaner is regulated by a control in a shielded AN size case mounted on the instrument board within convenient reach of the pilot. A small metering pump for the de-icing fluid is built into the head of the motor. The fluid is conducted to the driving head on the windshield and then through small holes in the stainless steel blade holder to the leading edge of the blades.

A separate control meters the amount of fluid needed and shuts it off if not required. The pump has a capacity of about 9 quarts per hour at maximum speed; normally about one quart per hour is required to prevent formation. Total weight of the equipment, excluding fluid tank, is approximately 6 1-4 pounds.

DOUGLAS DC-5

UNDER the pilotage of Carl Cover, Douglas vice-president, the DC-5 high-wing, sixteen passenger transport was successfully test flown February 20 at the El Segundo plant of the Douglas Aircraft Company.

Outstanding innovations in the new addition to the Douglas aerial family are the retractible nose-wheel and the tricycle landing gear, similar to that of the DC-4, the high wing and the sturdy, sleek fuselage of circular proportions suspended from the wing.

Design specifications call for a top speed of 248 miles per hour, cruising speed of 221 at 75% power and a landing speed of 64 mph. The plane carries 16 passengers and a crew of three. While definite performance figures will have to await official calibrations of instruents, Major Cover said after the flight, which lasted an hour, that the ship fully exceeded all expectations.

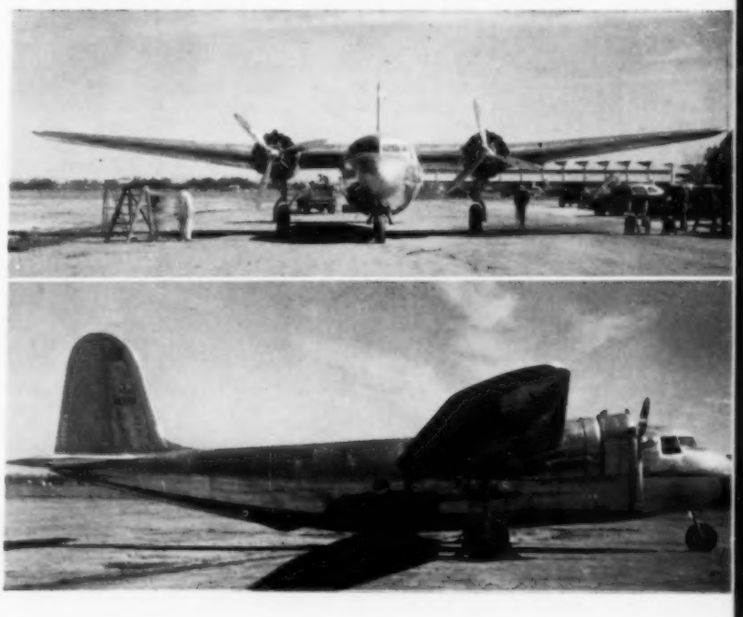
The plane was built at the El Segundo plant of the Douglas Company under the direction of Edward H. Heineman, Chief Engineer of that division and Edmond R. Doak, its General Manager and Vice-President of the parent organization.

Designed to meet requirements of feeder lines and commercial flying over routes now only partly covered by transcontinental airliners, the DC-5 incorporates every advance and advantage of its famous predecessor, the DC-3.

Definite interest in this ship already has been shown by European airlines and by operators of lines and airplanes in South America and Africa, Douglas officials stated.

SPECIFICATIONS

DIMENSIONS:	
Length	60′ 2″
Height (Tail Down)	16′ 0″
Wing Span	78′ 0″
Wing Area	825 sq. ft.
Tread	22′ 0″
WEIGHTS:	
Empty	11,500
Useful Load	6,750
Gross	18,250
POWER PLANT:	
Wright Cyclones or	
Pratt & Whitney Hornets-Wasps	
Total Horsepower (Sea-Level, Take-off)	1750 to 2100
PERFORMANCE:	
Maximum Speed	215 to 284 M.P.H.
Cruising Speed	182 to 221 M.P.H.
Landing Speed	64 M.P.H.
Take-Off Run (At S. L.)	750 to 875 ft.
Service Ceiling	21,700 to 23,000 ft.
Wing Loading	22.1 lbs./sq. ft.



N. A. A. Convention

(Continued from Page 8)

supply of civilian pilots and ground personnel; expanded aeronautical research; and expanded and safer private flying activities.

Mr. Ryan also paid eloquent tribute to N. A. A. and its leadership for their part in building public and government support for the present expanded aviation program.

The afternoon session began with a discussion of the way in which N. A. A. chapters are contributing to aviation development locally and nationally. Major Ralph Page, president of the St. Louis Chapter, Dave Click, president of the Greater New York Chapter, and "Skipper" Lloyd Bauer, president of Gateway Chapter at Clintonville, Wisc., handed out some helpful tips for all those interested in organizing chapters or increasing membership in their areas.

The President's Annual Address was then delivered by Mr. Horner. He declared the objectives of the Association were: Establishment of a federally supported national airport system, expansion of regular and reserve air forces of the Army and Navy, extension of air transport and mail service through new feeder lines, appointment of standing committees on aviation in both houses of Congress, promotion of a national program for development of private flying and expansion of a nation-wide youth aeronautical training program.

"The whole strength of our organization," he declared, "should be mobilized in support of larger appropriations for national defense and in civil aeronautics.

"We believe that the American dollar will buy more of defense in aviation than in any other branch of our military services. The total appropriation for our air force in the army for the present fiscal year, much larger than in previous years, amounts to but little more than the cost of one first-class battleship."

Then Mr. Horner called upon every N. A. A.'er to do his part in these words:

"We are facing a real crisis in our national life. The majority of the American people are agreed that we must and will defend our shores, people and institutions. I am calling on all of you to work directly and positively during the next two months in behalf of a national defense program in aviation so that this golden opportunity—based on an aroused public concept of our defense needs—be not lost."

Oliver Parks, president of Parks Air College, led the discussion at the session on aviation schools. Casey Jones, head of the Casey Jones School of Aeronautics, and T. Lee, Jr., of the Boeing School of Aeronautics, addressed this group.

An illustrated lecture was given by Paul E. Garber, assistant curator in charge of aeronautics of the U. S. National Museum, describing the first commercial flight by Tony Jannus from St. Petersburg to Tampa, Fla., in 1914. It was well done and amused and interested all those who were able to attend.

Final event of the afternoon was the meeting of the new Board of Governors for 1939.

AT THE convention dinner, Monday night, George M. Parker of St. Louis served as toastmaster in place of Fred D. Fagg, Jr., of Northwestern University, who was unable to attend as previously scheduled. President Horner presented the international and national record awards for 1938 and introduced the speakers of the evening.

Aside from the vitally important questions of air defense discussed by Maj. Gen. Frank M. Andrews, St. Louisans had a personal interest in the Chief of the General Headquarters Air Force because they feel he may be their neighbor when the G. H. Q. is transferred from Langley Field, Va., to Scott Field, Ill., as contemplated by the War Department. His talk is covered in full elsewhere.

Congressman Dow W. Harter of Ohio, chairman of the Aviation Sub-committee of the House Committee on Military Affairs, urged a "sensible but adequate" plan for an increase in Army Air Corps personnel and equipment.

He stressed the importance of providing financial aid for expanded research and experimental orders in sufficient numbers to pave the way for "accelerated or mass production" if necessary.

"Our air defense problems are not those of England, France, Germany and Italy," Mr. Harter declared. "We do not need to build plane for plane with those nations, but we must have an adequate air defense."

Although the convention was held far from the shores of the nation the Navy also was represented. Commander Ralph Davison of the Bureau of Aeronautics outlined the Navy's program as it relates to aviation plans. He also stressed the paramount importance of keeping our fighting planes in all branches of the services up to the minute in design and performance. He said it was hoped that the naval air force by 1942 will have reached the 3,000 plane strength authorized in the naval expansion act last year. Commander Davison also called attention to the fact that no matter how many planes the Navy possessed they would be of small value unless existing bases are expanded and new ones established along with aircraft tenders to support the air arm of the fleet.

ON TUESDAY, the final day of the meeting, the early session opened with a discussion of airport needs led by Major A. B. Lambert of St. Louis. Major A. B. McMullen, chief of the Airport Section of the C. A. A., addressed this group emphasizing the fact that inadequacy of airports today constitutes a serious lag behind the rapid development of aircraft. He outlined the activities of the C. A. A. in preparing the airport survey but could not discuss the recommendations contained therein prior to its presentation to Congress on February first. "Contrary to the general opinion," Major McMullen held, "it is the cost, not the fear of flying, which has delayed expansion." He said now that satisfactory low-cost planes are available and the big remaining obstacle to private flying is lack of sufficient well located and properly maintained fields.

Louis Inwood, assistant executive director of the C. A. A. Air Safety Board, spoke at the air safety meeting in place of Col. Sumpter Smith, chairman of the Safety Board, who had originally planned to be present. He outlined functions of the Board under the Civil Aeronautics Act, and invited all aviation officials and workers of every kind to help the Board by furnishing facts about any accident. He assured the airmen that the Safety Board will act promptly on all accidents, carefully and without bias, and express their opinion as to what can be done to prevent other similar accidents. Mr. Inwood repeatedly urged all flyers and others connected with aviation to write to the Board not only when required to report an accident, but to describe "close ones," and supply information about safety inventions to help the Board in its work. He described the members of the organization as "safety consultants," always at the service of aviators.

A unique and highly entertaining feature of the third day's program was the Express Luncheon with its Chicago & Southern shrimp cocktail; four varieties of turkey flown in by Braniff Airways, TWA, Delta Air Lines and Marquette Airlines; United Air Lines potatoes; TWA green peas; American Airlines cranberry sauce; Pennsylvania-Central celery; Mid-Continental butter, and salads and desserts flown in by Northwest Airlines and Eastern Air Lines. Pan American Airways flew the coffee from Venezuela, South America. Every article on the menu on that occasion was flown to St. Louis by air express. The airlines and air express deserve hearty commendation for their fine cooperation in making the luncheon such an outstanding success.

Joseph M. Darst, director of public welfare, of St. Louis, served as chairman of the luncheon, and Thomas N. Dysart, president of the St. Louis Chamber of Commerce, acted as toastmaster.

Brig. Gen. Walter G. Kilner, assistant chief of the Air Corps, who spoke at the luncheon, dealt with the technical aspects involved in efforts of the United States to keep step with foreign powers in development of military aircraft. He expressed gratification over President Roosevelt's recent approval of the $3,000,000 PWA allotment to improve the Air Corps laboratory and testing facilities at Wright Field, Ohio.

Following General Kilner, Col. Edgar S. Gorrell, president of the Air Transport Association, spoke on "The Civil Aeronautics Act and Industrial Self-Government."

Amos Culbert, of St. Louis, presided over the Air Transport Session which heard Col. J. Carroll Cone, manager of the Atlantic Division of Pan American Airways, discuss "Over-Ocean Air Transport," and Carleton Putnam, president of Chicago & Southern Air Lines, on "Domestic Air Transport."

IMMEDIATELY following the report of the Nominations Committee, an election of officers was held. Mr. Horner was re-elected president, to serve his fourth term in that capacity. George B. Logan was elected vice-president to succeed Major E. E. Aldrin. Mr. Enyart was re-elected secretary, and Col. John H. Jouett, who was appointed treasurer last October to succeed Mr. Grove Webster, was elected to serve another term. Howard C. Knotts was elected general counsel to succeed Col. Ruby D. Garrett. The Executive Committee remains unchanged. It is composed of Col. J. Carroll Cone, W. W. Brinckerhoff, Arthur S. Dudley, Richard C. du Pont, Col. Floyd E. Evans, Albert I. Lodwick, Albert H. Near, Oliver L. Parks and James E. Webb. District vice-presidents were elected as follows: First, Glynne M. Jones; second, C. S. Jones; third, Franklin K. Lane; fourth, Douglas O. Langstaff; fifth, C. W. Seiberling; sixth, L. A. Vilas; seventh, C. W. France; eighth, Moss Patterson, and ninth, Harry K. Coffey.

Governors-at-large were chosen as follows: Godfrey L. Cabot, Louis R. Inwood, Bernarr Macfadden, Carl B. Squier and Orville Wright.

The annual convention banquet, a dignified affair yet charged with enthusiasm and elevated spirits, was a fitting climax to the successful three-day program. Under the guidance of the urbane George B. Logan as toastmaster, the din of hundreds of diners enjoying their repasts in the great Gold Room was brought to a soft hush by the time the speakers were ready to deliver their orations.

Governor Lloyd C. Stark of Missouri, one of the honored guests, made an introductory address preceding Col. Louis Johnson, assistant secretary of war, the guest of honor and keynote speaker of the convention. Colonel Johnson's address was broadcast over the CBS national network.

The final event of the banquet was the official presentation by President Horner of the Thompson Trophy to Col. Roscoe Turner. The famous racing pilot, in a few simple, good humored words of acceptance immediately won the affection of his audience and when he had finished he and President Horner, who recounted the past achievements of the colorful flyer, received a tremendous ovation from the assemblage, which lasted for several minutes.

News of the Month in Review

MANUFACTURERS

Export Notes

• Leighton W. Rogers, retiring president of the Aeronautical Chamber of Commerce of America, reported to members at their annual meeting that U. S. aircraft manufacturers have increased their sales in Latin America despite the bitter competition from European nations. "Our sales of aeronautical products to countries south of the United States amounted to $11,040,088 during the first 11 months of 1938 compared to $10,530,756 for the entire year 1937. While this is satisfactory evidence of the high regard which our neighbors have for American planes the record business is remarkable in view of the tactics employed by some Europeans in an effort to get that trade."

Mr. Rogers pointed out some of the methods employed by the Europeans. They have offered the Latin American countries planes of all types at a fraction of their cost of production. Further, exchanging aircraft for commodities and minerals has been attempted, and more similar tactics may be expected.

The Europeans have granted very long term credits, Germany and Italy allowing five years. Our American manufacturers have been at a disadvantage in competing with the European governments' granting of credit and subsidies, for U. S. private banks have to handle the credit on American sales, and recently two million dollar orders were rejected by U. S. banks because of high discounts on the paper.

"The European system also includes interchange of official and semi-official aviation missions, including instruction groups, some of whom have barred their students from flying in American equipment. There are other methods even more vicous in character," Mr. Rogers said. "While to date American aircraft have been sold abroad because of superior performance, a more liberal credit system must be devised either with or without the active support of our Government. A more general exchange of aviation personnel should also serve to offset the work of our European competitors."

Production Outlook

• Considering the indicated expansion of military demand might push annual aircraft production in this country to a level well above 300 million dollars, prospects for aviation manufacturing companies are favorable, according to Fenner and Beane of the New York Stock Exchange. Production in 1938 is expected to total about 150 million, 30 per cent more than in 1937. Net profits for 1938 should show a similar climb. Although the transport division faces a net loss for 1938, the largest since 1934, hopes and prospects are bright.

Military aircraft demand will undoubtedly be intensified, even if press accounts of demand do not materialize fully. "Within about three years, as many as 7,000 planes may be added to this country's present air force of about 3,000 ships," the report states. Export demand and domestic transport needs will likewise contribute.

When and how much this increase will be felt is problematical; as only drastic alteration of Army-Navy procurement methods will avert delays, it will likely be 1940 before the full impact on production is felt. Regarding profits, doubling plant output will entail much greater costs of production.

"Because of defense program considerations, this new Government agency—the CAA—may achieve success in its efforts (1) to impart greater permanence to route franchises by issuing certificates of convenience and necessity, (2) to further stabilize conditions by eliminating unsound competitive practices, and (3) to put mail pay on a definitely more equitable and profitable basis," the survey concludes.

• A favorable earnings outlook characterizes the aviation industry, according to Poor's Industry Survey. Manufacturers of aircraft, engines, and accessories are assured of substantial volume of military

GOOD NEWS! Pilots

Here's Your Passport Across The Country

NOW, no matter where you fly in the 48 states or in Canada, selected petroleum marketers will honor your Humble credit card for credit purchases of quality aviation fuels and engine oils. This new National Credit Card Plan is for the convenience of our customers—it enables you to buy on your Humble card at practically every major airport in the country. Credit cards issued by Phillips Petroleum Co., Standard Oil Co. of Louisiana, Standard Oil Co. of Kentucky, and certain other companies will be honored at Humble airport dealers and service stations.

Why not apply for this convenient nation-wide "charge account" today?

ALL THESE ADVANTAGES—

- Your Humble credit card is honored at selected airport dealers in all 48 states and in Canada.
- You receive only a single monthly statement, regardless of where purchases on the credit card are made.
- You no longer need to carry large amounts of cash with you on long trips.
- Your Humble card serves as an excellent means of identification wherever you may be.
- A Humble credit card can be used for purchases for both airplane and automobile, or the accounts will be carried separately—as you wish.

Aviation Dept.
HUMBLE OIL & REFINING COMPANY
Houston, Texas

IN THE SOUTHWEST BRANIFF AND AMERICAN AIRLINES USE HUMBLE AVIATION GASOLINE

business, on which profit margins may be wider. Demand from abroad also will improve, as will orders from domestic transport companies, the survey reports.

Total output of 2,873 craft during the first nine months of 1938 was 4% greater than the like period of 1937. For the first ten 1938 months, exports of airplanes, parts, and accessories totaled $58,283,000, or nearly 88% larger than in the like 1937 months.

Aeronautical exports during October, 1938, were 35% ahead of 1937 figures. With European nations continuing to strengthen their air forces, an improvement in exports definitely is forecast.

As for air transport traffic, the 397 million revenue passenger miles flown during the first ten 1938 months were 12½ per cent ahead of those in the comparable 1937 period. Traffic volume in 1939 will, in all likelihood, register further gains. Success attained by the new Civil Aeronautics Authority in adjusting tariffs more in line with expenses will be of primary importance in determining 1938 net results.

United Expansion Program

● Donald L. Brown, president, has recently announced expansion of United Aircraft Corporation's manufacturing facilities in the engine and propeller divisions to provide more space. The Chance Vought division will be moved from East Hartford to Stratford, Connecticut, to join the Sikorsky factory. The Hamilton Standard Propellers Division will occupy Vought's present plant. Pratt & Whitney will be expanded to occupy the present Hamilton Standard factory. Increased demands from both commercial and national defense sources necessitate these changes, Mr. Brown stated. The Pratt & Whitney division will have available 100,000 sq. ft. of additional floor space, and Hamilton Standard 44,000 sq. ft. Increased efficiency in operations, greater production capacity, with a minimum expenditure for additional plants has been the goal. "It is confidently expected that the movement of Vought employes to Stratford will be rapidly offset by increases in the personnel of the Pratt & Whitney Aircraft and Hamilton Standard Propeller Divisions," Mr. Brown said.

● Pratt and Whitney powered planes recently won two events in the New-York Miami free-for-all race on Jan. 7. Max Constant, first place winner, flew a Beechcraft powered with a Wasp Jr. owned by Jacqueline Cochrane. Russell Holderman came in 38 seconds later to take second place, flying a Lockheed 12 with two Wasp Juniors.

Martin at Production High

● The Glenn L. Martin Co. has announced that on Jan. 31 the company's employment reached an all-time high for the fifth successive month, 4,128 persons being employed, and of these 1,400 being on night-shift. The plant is operating 16 hours a day, five days a week. President Martin, discussing the plant's capacity in connection with the national defense program, stated that the company could produce 1,200 planes a year by inaugurating a 24-hour, 7-day working schedule.
● Six Martin Bombers of the Argentine Air Force were recently dispatched to Chile from Buenos Aires with medical supplies for the earthquake stricken country.

Lockheed 1938 Production Hits $10,000,000

● Robert E. Gross, president of Lockheed Aircraft Corporation, has estimated that the company's gross sales for 1938 would reach a new peak of $10,000,000, a 100% gain over 1937. As of Dec. 31, there was a backlog of $30,000,000, for delivery in 1939. Beginning in March or April, production of one plane per working day is anticipated. The Burbank plant's employment has reached a peak of 3,581, a yearly increase of 79 per cent.

● Delivery of the last two planes has been made to the French Air Ministry, which together with the first delivered earlier, represents a total order of $262,000. The three Lockheed 14's will be used on the line Air Afrique, operating between Marseilles and Madagascar. Lockheed has begun delivery of two Electras to Servicio Aero Columbiano, government-subsidized line of Colombia. The order represents $125,000 worth of business. E. C. McLeod and L. T. Cavender will fly the ships, and will be accompanied by J. W. Fisher, sales representative and three mechanics.

New Order for Ryan

● A contract for parts and accessories amounting to $250,000 has been awarded the Ryan Aircraft Company. The order is for engine cowlings and engine firewalls. Last year Ryan was awarded a contract for $100,000 worth of exhaust manifolds. The current business brings Ryan's backlog or orders to an all-time high of $600,000. During the first forty-five days of this year, Ryan closed contracts for new business for its Contract Manufacturing Division exceeding last year's total sales of this department. Other contracts recently closed by the Ryan company are with the U. S. Army Air Corps, Brewster Aeronautical Co., Consolidated Aircraft Corp., and the Douglas Aircraft Co.

Timm to Van Nuys

● The Timm Aircraft Corporation is preparing to move its plant to a 40,000 sq. ft, building at Van Nuys, Cal. New financing will provide funds for removal and expansion. Long an established repair and reconstruction shop, the company has recently completed tests on the new high-wing transport announced last fall. Its design incorporates many new safety features including Handley-Page slots and steerable nose wheel, which is designed for transport and feeder service. The company will also manufacture a large line of parts and accessories.

New Company

● Dycer Aviation Supplies is a new organization recently established in Los Angeles. Maintaining a wide range of supplies and equipment, the company has been named southern California distributor for General Paint Corporation products, and will serve manufacturers, shops, operators, and private owners.

M. A. A. Elects Officers

● Samuel S. Bradley was re-elected chairman of the board of the Manufacturers Aircraft Association at the annual meeting in New York on January 31. Frank H. Russell was re-elected president and John A. Sanborn general manager. The association administers the cross-licensing patent agreement for the airplane manufacturing industry in the United States.

The following vice presidents were elected Eugene E. Wilson, United Aircraft Corp., East Hartford, Conn.; Edgar N. Gott, Consolidated Aircraft Corp., San Diego, Calif.; William E. Valk, Curtiss-Wright Corp., New York; and John M. Rogers, Douglas Aircraft Company, Santa Monica, Calif. Joseph T. Hartson, The Glenn L. Martin Company, Baltimore, Md., was elected secretary and James P. Murray, Boeing Aircraft Company, Seattle, Wash., was made treasurer.

The above officers were also elected to the new board of directors as were W. H. Beal, Aviation Manufacturing Corp., New York; Clayton J. Brukner, Waco Aircraft Co., Troy, O.; L. R. Grumman, Grumman Aircraft Engineering Corp., Bethpage, N. Y.; and J. H. Kindelberger, North American Aviation, Inc., Inglewood, Calif.

Mr. Russell stated in his Annual Report: As in past years it has been estimated that over ninety per cent of the total sales volume of airplanes during 1938 was licensed under patents owned or controlled by members of the Association, thereby continuing to carry out the original policy of making licenses at the same terms available to all aircraft manufacturers in this country who desire to enter the field. A total of 953 patents have been brought under the operation of the Cross-License Agreement to date, 64 patents having been added during the past year. By making important technical progress available to all manufacturers the Association has made possible the prompt application of advanced ideas to all current models and has encouraged research and engineering development in this country without fear of interference from wasteful litigation and controversy within the aircraft industry.

Reorganization for Kinner

● Kinner Airplane and Motor Corp., is now being reorganized. Assets and properties of the company have been acquired by B. B. Robinson and Reese L. Milner, and re-financing will be effected immediately. Earl Herring will be president of the new company.

Aircraft Precision Buys Out Herberts Co.

● Aircraft Precision Products of Los Angeles has recently been organized for purchasing all of the assets and liabilities of the Herberts Engineering Corp., largest manufacturers of hydraulic equipment for aircraft on the Pacific Coast. The company has shown earnings for 1938 and has a good backlog of orders. C. A. Herberts

GOVERNMENT APPROVED REPAIR STATION No. 195 CLASSIFICATIONS 1, 2, 3, 4, 5, 8, 9, 10, 11, 12.
BOOTH Airline Maintenance for the Private Airplane HENNING INC.
EVERY FACILITY FOR MAINTENANCE AND OVERHAUL
ALL MAKES OF AIRPLANES, ENGINES, PROPELLERS
INSTRUMENTS, RADIOS AND ACCESSORIES
LOVE FIELD · DALLAS · TEXAS
QUICK SHIPMENT OF REPLACEMENT PARTS FROM STOCK

is president, Robert A. Lawson is chief engineer and Earl H. Howard is general superintendent.

Largest Backlog for North America

• North American Aviation is presently concentrating on deliveries of advance trainer ships to England and finishing up its current orders for observation planes from the U. S. Army Air Corps. The swift assembly pace set by North American since September of last year has been maintained, three planes coming off the line daily. 75 of the original British order of 200 trainers have been delivered, and the order has been duplicated in February. Confirmation is awaited on an order for 200 similar planes for France. This will bring the backlog of the company to an all-time high exceeding $28,000,000.

SCHEDULED AIR TRANSPORT

Braniff Applies for New Routes

• Braniff Airways filed applications with the Civil Aeronautics Authority on Feb. 28, for certificates of convenience and necessity on the following routes: (1) Kansas City, Mo.—Des Moines, Ia.—Rochester, Minn.—Twin Cities, Minn., and Des Moines, Ia.—St. Louis, Mo. (2) Denver, Colo.—Kansas City, Mo.—Memphis, Tenn. (3) Amarillo, Tex.—Oklahoma City, Okla.—Tulsa, Okla.—Memphis, Tenn.—Atlanta, Ga. (4) San Antonio, Tex.—Big Spring, Tex.—Amarillo, Tex.—Pueblo, Colo.—Denver, Colo. (5) Tulsa, Okla.—Shreveport, La.—New Orleans, La. Braniff Airways has already made formal application to the CAA for a route serving Houston, Tex.—Shreveport, La.—Memphis, Tenn. By not later than Saturday, March 4, company officials stated an application is to be made for another route between San Antonio, Tex. and El Paso, Tex.

T. E. Braniff, airline president, specifically pointed out in testimony before the CAA on January 26, during the hearing on a route between Wichita, Kans. and Pueblo, Colo., that application for the new routes was part of a "system" expansion program. "The (proposed) system is designed to be a feeder and connecting system serving the trade territory of our present operations," Braniff testified. Substantially it places practically all communities served by our present line and communities served by these proposed lines in convenient connection with practically all of the other airlines of the country. The advantages of a unified management of a system serving a compact trade territory is, first, the control it gives over schedules; secondly, the economy and convenience of operation; thirdly, the unified traffic development plan."

Under the projected expansion plan Braniff Airways' route mileage would increase from 2,711 miles to 8,308 miles, while its miles flown daily would increase from 9,000 to almost 20,000. Should Braniff Airways be granted these additional routes, it would become the nation's largest airline in point of miles flown daily.

In filing the applications, Mr. Braniff indicated his airline is prepared to immediately inaugurate service on the proposed routes using modern, twin-engined Douglas and Lockheed equipment. Schedules on the new routes would be coordinated with the present Braniff flights and with transcontinental air transport operators. Operations bases would be located at strategic points on the proposed system.

December Traffic Increase

• Civil Aeronautics Authority reported February 10 that the scheduled air lines in the United States carried 89,921 revenue passengers during December, 1938, an increase of more than 55.45% over the same period in 1937. The revenue passenger load factor for the month was 48.49%, an increase of 17.66% over the December, 1937, figure.

The airlines flew a total of 4,665,063 revenue plane miles and 37,366,805 revenue passenger miles, and carried 761,090 pounds of express for a total of 451,045,139 express pound miles during December, 1938.

New Schedule for C. & S.

• Beginning Feb. 15, Chicago and Southern's new route to the southeast, "The Acadian," Flight 1 will be inaugurated with departure from Chicago at 8:25 a. m., arrive Birmingham at 2:05 p. m.; arrive

GET SOME PLACE IN AVIATION *Your place is with*

DAWN PATROL

With the finest flying equipment obtainable, modern machine shops, classrooms and dormitories, SPARTAN Training has acquired International Leadership in Aviation with the Largest enrollment in the School's history, including Latin-American and foreign students from the four corners of the World.

SPARTAN

SCHOOL OF AERONAUTICS

Affiliated with the Spartan Aircraft Company, manufacturers of
SPARTAN ALL-METAL COMMERCIAL EXECUTIVE
CONVERSION 7W-F and ZEUS MILITARY AIRPLANES

GOVERNMENT APPROVED REPAIR STATION NO. 50

Tampa 6:35 p. m. Northbound via Eastern Air Lines will leave Tampa at 7:00 a. m.; arrive Memphis 11:30 a. m., connecting with Chicago and Southern, arrive St. Louis at 1:16 p. m. and Chicago at 3:12 p. m. Chicago and Southern will also soon return to its "Rainbow," afternoon flight direct from Chicago to New Orleans.

• Chicago and Southern's annual increase in passenger revenue in 1938 was 39%, according to D. D. Walker, vice-president, while showing an increase of 3% in miles flown. With the outlook for 1939 brighter than any previous year, the company is negotiating for new equipment to increase passenger capacity 60%. Application for a certificate of convenience and necessity has been made to operate between Memphis and Houston via Pine Bluff and Shreveport.

Air Sickness Studied

• United Air Lines has just completed a survey of airsickness with medical director Col. A. D. Tuttle in charge. He reports that only three-tenths of one per cent of passengers flown have suffered airsickness, and only .59 of one per cent of sickness of any kind. The report covers a year, and the low incidence of discomfort, Tuttle said, may be attributed to a moderate rate of ascent and descent, better ventilation and heating in modern transports, and higher flight altitudes in smooth air.

A. A. Continues Traffic Gains

• Revenue passengers carried by American Airlines in January of this year totaled 25,032, or an increase of 50.8 per cent over January, 1938, Vice-President Charles A. Rheinstrom reports. Revenue passenger miles have shown an increase of 42.2 per cent for a similar period.

• In anticipation of a banner year for 1939, American has on order ten new Flagships, five to be delivered in March and five in May. Vice-President Rheinstrom also announced that under a new ruling of the Associated Aviation Underwriters, aviation trip insurance may now be sold to all passengers regardless of age, a reflection of the underwriters' confidence in the safety of domestic air lines, he reported.

Eastern Elevates Pilots

• Eastern Air Lines has announced the promotion of the following seven pilots to the rank of captain: W. P. Poe, V. A. Peterson, J. W. Williams, A. B. Duke, W. M. Hampson and J. R. Richardson, and F. L. Dorset. In addition 17 new pilots have been employed: Harvey N. Glass, J. B. McKelvey, B. R. Fairchild, Orris F. Firth, William C. Haines, Henry C. Morley, Parker Cole, E. F. Cullerton, S. I. Griesmer, W. D. Griffith, B. R. Hall, E. F. Harrington, L. M. P. Hodge, R. J. Nemmers, H. B. Brown, J. A. Themm and H. L. Alford.

Delta Shows Increase

• During the month of January, Delta Air Lines enjoyed its largest month since the inauguration of service from Fort Worth in March, 1938. January's revenue exceeded that of November, the previous high month, by 10.9% and was 27% in excess of the quota set for January, according to Chas. P. Knecht, Fort Worth division traffic manager. Delta's system revenue for 1938 was 28% in excess of the 1937 figure.

MISCELLANY

Tennessee Plan Successful

• A total of 2,500 individuals enrolled in the ground school aviation courses in the State of Tennessee received their primary training in fundamentals of aeronautics during the first semester ended January 15. From these ground schools a total of 71 out of 75 students received private pilot ratings from the Civil Aeronautics Authority. Fifteen top students in each of the five ground schools were given free flight training at Memphis, Chattanooga, Johnson City, Knoxville and Nashville.

Major Walter Williams, director of aeronautics for the State of Tennessee, under whose guidance the training program was put into effect, announced that a total of 3,516 hours were flown by the students since June, 1938, "without a scratch to student or pilot." He also reported that the cost of repairs and maintenance was only 23½c per hour and that the training ships were in as good shape at the end of the semester as when new.

The plans for the 1939 training program include larger enrollments and many new innovations arranged to provide wider aviation training to more individuals. Ground school classes are already under way with a more comprehensive course of instruction than was provided during the first six months period, and with additional text books compiled by the state Bureau of Aeronautics.

JUST AMONG OURSELVES

(Continued from Page 4)

on a national scale were it not for the fact that people directly connected with aeronautics are split up into a myriad of self-centered segments without the slightest vestige of coordination.

The two-day National Aviation Forum held recently in Washington was an attempt to create unified action and bring into one body both the aviation family and representatives of strong national organizations and fields of endeavor. We sincerely hope the Forum will be the beginning of uniting all the little heterogenous groups scattered over the country.

There is enough common ground in this nation that affects everyone directly or indirectly concerned with aeronautical development and progress. Whether it's the N. A. C. A. seeking more money for research, or the Aeronautical Chamber of Commerce trying to stop profit limitation laws, or the sportsmen pilots working to curb over-regulation, or Podunk Center seeking airport improvements and feeder line service, or the American Legion backing up an unprecedented national air defense program, every mother's son of them are in the same boat, on the same water and steering in the same direction.

One reason for the conservative success of the regional aviation conferences has been the intermingling of people in civil life with leaders in aviation. But it's on such an infinitesmal scale and purely of local character that the benefits are rarely felt. Three separate aviation meetings hold the spotlight in the first three months of 1939—the N. A. A. Convention in St. Louis in January, the National Aviation Forum in Washington in February and the Southwest Aviation Conference in Fort Worth in March. These three meetings are typical of aviation organizations in the Uinted States. With a few fundamental exceptions they are carbon copies of each other with the same speeches on the same subjects. When a man of force and vision does happen along and points the way with extraordinary intelligence, the stimulation is temporary and we all go home commenting on what a helluva fine speech we heard. What if all three meetings had been combined into one? Isn't it logical to believe that one large and powerful gathering would accomplish more actual good at less expense to all concerned in time, money and energy?

The net result for groping around in the mire of isolated self interest is lost motion, indecision, confusion, over-lapping of programs and in many cases unjustifiable clashing of interests. In addition, so many meetings, all with the same express purposes, result in a very substantial loss in prestige to all.

The only solution as we see it is for each group and organization to carry on their particular jobs throughout the year, have their meetings and discuss their problems and programs as they do now, then weld themselves into one national annual air congress with several thousand registrations instead of several hundred and with representatives from every branch of aviation and civil life, from every fork of every creek.

Sell one good man in about two dozen aviation organizations from the Junior Aviators to the Air Line Pilots Association and he can do the job in his own balliwick. When the industry's organizations get together it will be easy enough to garner support of those uncounted thousands who are clamoring to do something for aviation and for someone to point the way.

Carl B. Allen, member, AIR SAFETY BOARD, C. A. A.

L-R: Jack Kelley, Max Harlow and J. B. Alexander, officials of the newly formed HARLOW AIRCRAFT COMPANY.

John W. Sharp
From Douglas to Ryan

PERSONAL NOTES

• GEORGE W. LUPTON, JR., has been appointed general counsel of Braniff Airways, and will make Oklahoma City his headquarters. A graduate of Harvard and with a navy service record, Lupton has long specialized in air transportation and aviation law, is author of *Civil Aviation Law*, and has written numerous articles on the subject. He was with Boeing School and United Air Lines for about two years before becoming associated with Braniff.

• J. G. FLYNN, superintendent of communications for American Airlines, has announced the promotion of R. L. BIBB to the position of System Chief Radio Operator. With the company since 1931, Bibb replaces V. A. WELSH, who asked to be relieved of these duties due to the great amount of traveling incidental to the position.

• HUGH L. SMITH, operations manager for American Airlines, has announced the appointment of ROBERT H. SCRUGGS as station manager for American at Tucson. Scrubbs was formerly stationed at Columbus, Ohio.

• The appointment of WILLIAM C. BURKS as Memphis District Sales Manager was announced by D. D. WALKER, vice-president of Chicago and Southern. Burks received his training at Parks Air College, and the Universities of Kentucky and Pennsylvania.

• ARTHUR J. WILLIAMSON has been added to the technical staff of Summerill Tubing Company of Bridgeport, Pa., as Metallurgical Engineer in charge of research and development.

• New president of the Aeronautical Chamber of Commerce is COL. JOHN H. JOUETT, elected at the annual meeting in New York on Jan. 26, to succeed LEIGHTON W. ROGERS, who declined to be a candidate. Other officers elected are: ROBERT GROSS and W. T. PIPER, vice-presidents; C. G. TAYLOR, secretary and FRANK J. WALSH, treasurer and assistant-secretary. The new executive committee includes W. H. BEAL, LAURENCE D. BELL, DONALD L. BROWN, CLAYTON J. BRUKNER, SHERMAN M. FAIRCHILD, COURTLANDT GROSS, CHARLES MARCUS, THOMAS A. MORGAN, JAMES MURRAY, and GUY W. VAUGHAN.

• United Airlines has announced the appointment of the following air line pilots to supervisory positions in their western division: HARRY HUKING, JOHN M. HODGSON, J. J. O'BRIEN, and R. D. PETTY. Similar changes in the eastern division will include GEORGE GROGAN, EMERY J. MARTINA and C. A. THOMPSON.

• United's vice-president HAROLD CRARY announced the personnel changes in the traffic department as follows: E. L. DARE, Newark traffic representative, JACK SCHMUNK, transferred to Cleveland sales office, and BOB MEYER and GORDON LOGAN, to the traffic office there. Other changes will affect S. R. NEWMAN, STANLEY HALBERG, BOB KINKEAD, HARRY TAYLOR, TOM GLASSFORD, GIL YEIENDECKER, WILLIS CAMP, and W. T. McINTYRE.

• JEROME CLARK HUNSAKER, department of Mechanical Engineering head at M. I. T., will become aeronautical consultant to American Export Airlines, according to W. H. COVERDALE, president. The announcement of Dr. Hunsaker's appointment as aeronautical consultant to A. E. A. follows closely the appointment of DURSTON G. RICHARDSON as operations manager of the airline which plans to inaugurate flights across the Atlantic early this Spring.

THE INDUSTRY IN '39

THE writer just returned from an extended trip and it is his opinion that the present as well as the future outlook for aircraft and its allied lines is they are just beginning to come into their own. It is my further belief that irrespective of general business conditions, the aircraft industry will continue to boom for at least the next five years before having any recession. This is predicated on knowledge and belief of international political situations throughout the world.

—J. J. Mascuch, President
Breeze Corporations

The year of 1939, we think, will be a very busy one for the aviation industry. The requirements for national defense, air transportation and the private flier will provide a great needed and well deserved increase in production. In step with this, improved engine and plane performance should help to keep America in its present outstanding position among the nations of the world.

—T. Z. Fagan
Scintilla Magneto Division,
Bendix Aviation Corporation

1939 should be a better aviation year than 1938. The large increase in student permits, the continued growth of private owner interest and the possibility of a large government-sponsored training program all point to increased sales. Business conditions, of course, will be a determining factor; but it is our opinion that more "24" sales will be made in 1939 than we enjoyed in 1938 and previous years.

—Sherman M. Fairchild, President
Fairchild Aviation Corporation

I BELIEVE that commercial aviation in the United States will show a 25 to 50 per cent increase during 1939. The public is becoming more and more aware of the comfort and safety and convenience of scheduled airline flying and I estimate that the various airlines in the United States will show from 25 to 50 per cent increase in the number of passenger miles flown in 1939 over 1938.

Private flying, in my opinion, will show a 25 per cent increase, due to public acceptance of that type of recreation and transportation, due, also, in part, to a slightly improved condition in general business.

I believe the manufacturers of aircraft will show approximately a 50 per cent increase, due to the added requirements of the airline operators and private pilots, and due, in part, to an increase in military construction.

Therefore, the outlook for a properly prepared and qualified man will be most encouraging in 1939, with a gradual increase in compensation with the increasing shortage of properly trained men.

—Oliver L. Parks, President
Parks Air College, Inc.

Ports of Call

Correspondence from the Airports and Airways

Brownsville, Texas

Woman Flier at Sixty-Five Still Active
Charro Days Attract Many Visitors

Instructor Rodney More and Pilot Miss Stewart dropped in for a visit having flown from Corpus Christi on only four gallons of gas in their Taylor Cub.

Mr. and Mrs. M. J. Florance arrived in their Stinson with a friend who had formerly lived in the Rio Grande Valley over 25 years ago. They flew all the way from Minnesota within 40 miles of the Canadian Border to Brownsville to enjoy Charro Days, our annual Fiesta celebrating the romance of old Mexico.

Mr. and Mrs. V. V. Young came in their Stinson from Chicago during the cold northern winter to enjoy some tropical fishing out of Brownsville and the lower Rio Grande Valley.

Mrs. K. M. Edwards of Pittsburgh is by her own admission proving that flying is safe for old ladies. She got her pilot's license when she was 58 and now at 65 she is flying all over the country. Though she does not hold her license any more due to fading eyesight, she is still active and has her pilot, Charles Curry, with her. She has 80 hours to her credit and is convinced that one never is too old to fly.

Major Max C. Fleischman, former head of the Fleischman Yeast Company and now a citrus grower in California, landed here after a non-stop trip from Barbara, California. He is en route to Tampico, Mexico, but wanted to look over the citrus growth in the Valley, to get warm and to fish. He was astounded by the growth of the Valley and envied us our pink grapefruit.

Mr. and Mrs. Bruce Gimble, of New York, took off from here en route to Mexico City in their Beechcraft. From Mexico City they plan to go on to Buenos Aires.—*THEODORE C. PELIKAN.*

Charlotte, N. C.

Ninety-Nines Active at Charlotte

A new pilots' clubhouse at the Charlotte airport was inaugurated with a meeting of the Nine-Nines. The C. A. A. inspector, Jimmie Nall gave a talk on navigation by radio and the many new important phases of the art. Jessie Woods presented each girl with a handkerchief made of the parachute silk from the chute which saved her life some time ago. There were many new women pilots present, among them, Marie Hutchins, Gertrude Johnson, Edith Efird. Diddy Nelson and Nella D. Cannon. Out of town guests were Peggy Haggopain and Ann Johnson from Augusta, Georgia, Nell McKee from Salisbury, Nell Behr from Anderson, S. C., and Carroll Boone and Clayton Patterson from Charlotte.

Mable Clemson, Jessie Woods and Charlotte Frye attended the Miami Air Maneuvers last month.—*CLAYTON PATTERSON.*

Coffeyville, Kansas

Usual Large Number of Visitors at Port

The Inman Bros. Flying Circus have purchased three new 525 HP Hornets from United Air Lines to install in their Boeing 80-A. They have recently sold their Ford Tri-motor to O. W. Nichols of Columbus, Ohio. Airport manager Lynn Berentz has traded his OX American Eagle to Harold Thomas and Harry Gaines of Wichita for a new Continental 50 Luscombe. Jess Jones has purchased Hank Duncan's Wiley Post.

Inspector H. F. Illich of Wichita was a recent guest of the Aviation Club and gave a talk on the proposed training of 20,000 student pilots yearly. At another meeting of the club, Lieut. Harry I. Hutton of Wichita was the guest.

Lawrence Coyle of this city is one of the cadets who was awarded his wings at Randolph Field February 2.

Recent visiting pilots on the local field include the following: Alfred Morris from Wichita in his Stinson en route to Rogers, Ark.; Glen McConnell from Parsons in an Aeronca; "Stew" Stewart, was her observer from Chanute in his Cub; Billy Parker from Bartlesville in Phillips Petroleum's Lockheed-12; Lieut. Bud Enyard from Kansas City in a Douglas O-46; Joe Hamilton from Blackwell in a Taylorcraft; Alonzo Stewart from Bartlesville in his Cub; O. E. Dickerhoof from Chanute in an Aeronca, en route to Claremore; Ralph Kistler and Arthur Johnson in an Aeronca flying from Kansas City to Tulsa.

Bob Hickerson was the only student to solo during the past month. He was checked out by Hank Duncan on the Aeronca.—*HAROLD E. HAGGARD.*

Dallas, Texas

New Airline Inaugurated
Bennett Aircraft Ready to Begin Production

One of the new side-by-side Cub Coupes will soon put in an appear at Hanger A, as Lou Foote has taken delivery on one. In the meantime, Bill Strohmeier from the Piper (Cub) Factory is here with a Cub Coupe demonstrator. In the past month Lou Foote has sold these little ships to the following: Kilman M. Parker Flying Service, Greenville, Texas; Clarence Theo Hammonds, Floydada; Shamrock Flying Club, Shamrock, Texas; Sam Coffman and O. N. Yarborough of Vernon and Otho Eddleman of Crane who has built an airport on his ranch for himself and visitors.

A new airline started in Dallas last month known as "Essair." The itinerary includes Amarillo, Lubbock, Big Spring, San Angelo, Austin and Houston. At present they are using a Fleetster and according to Sam Marshall, Jr., one of the owners, they expect to acquire some bi-motor equipment soon.

As befits a parachute sales representative Leon McKennon was the first to set a record for sales on Love Field for 1939. Leon, who represents Irvin in this section of the country, sold 20 chutes from February 1, to 15.

TWA has called three pilots from Love Field. Max Parkinson, who formerly flew for Oil Well Drilling Company; Buddy Hagins and Jim White. They all recently received their Instrument Rating from Dallas Aviation School.

Speaking of Instrument Ratings—Freddie Ridenour of King Oil Company, Wichita Falls, will, by this time have his rating—he hopes. Freddie has been studying and taking several of his written exams at Dallas Aviation School.

Winston Castleberry, Treasurer of Booth-Henning, Inc., with Les and Martie Bowman flew to the Stinson factory at Wayne, Michigan last month to see the new small 3-place Stinson perform. It is powered with a 75 horsepower Lycoming and according to Les, who saw it perform, it is very much O. K.

Hugh Drane has joined the skyway commuters—flying between Dallas and his ranch at Corsicana. He is building a hangar on the ranch large enough, so we understand, to house six ships.

The Women's National Aeronautical Association of Dallas attended the Southwest Aviation Conference in Fort Worth. At a recent luncheon meeting held at Mrs. Ben Branson's, the Dallas Unit entertained as guests from Fort Worth, Mrs. George Haddaway, Mrs. R. L. Bowen and Mrs. Rudy Flato. Mrs. Haddaway outlined the program of the entertainment for the Southwest Conference and enlisted the aid of the Dallas W. N. A. A. as hostesses.

Frank Say, Engine Shop Superintendent of Booth-Henning, Inc., attended the meeting of the Institute of Aeronautical Sciences in New York recently.

Bennett Aircraft reports that it is definitely ready to go into production soon on the Bennett Bi-motor, but that no details can be released as yet. So until next month—smooth landings.—*DOROTHY G. RODREICK.*

Fort Worth, Texas

Southwest Aviation Conference Holds Spotlight in March
Airway Traffic Control Department Added

Everyone is looking forward to the Southwest Aviation Conference to be here March 2, 3 and 4. At such time we shall be honored with the following outstanding personages of the aviation industry: Maj. Al Williams, Clinton M. Hester, administrator of the C. A. A., Brig. Gen. Barton K. Yount, asst. chief of the U. S. Air Corps in charge of training, W. G. Skelly, Tulsa, Jacqueline Cochran and Maj. A. B. McMullen, chief of the airport division of the C. A. A.

The C. A. A. men won class B in the City Bowling Tournament recently. The following players on the team were responsible for the victory: Arty Blumgren, Less Mariner, Dick Presser, Frank Auruh, L. P. French and Norman Simmons.

"Frenchy" reports good work in his repair shop. He has recently overhauled the Beechcraft of Harry Hammill of Austin, A. T. Strong's Stinson from Graham, and the C. A. A. plane flown by L. S. Mariner.

Fort Worth proudly reports the installation of an airway traffic control department. This department has only been a part of the network of air navigation for about two and a half years, so we are proud to be a part of this definite progress. The following men have been stationed here: C. T. Tolpo, from Cleveland, Ohio, A. C. Leathers from Oakland, Calif., T. N. Gore from Washington, D. C., A. C.

Lybarger from Chicago, Ill., R. B. Trego, Detroit, O. H. Richardson, Detroit, N. J. Palmer, Kansas City, O. L. Blan, Fort Smith, Ark., H. O. Parker who was formerly stationed at Caddo, Tex.

Francis McDonald of Laredo who visits our port frequently was forced down near Freer, Texas, recently. Inasmuch as Francis can still smile, it must have been a "happy landing," but not so for his ship which didn't find the mesquite trees very satisfactory for landing.

D. P. Greene, a photographer with the Star Telegram here, has taken over the management of the coffee shop in the Administration Building. He anticipates opening a 'night spot' in the building near the control tower, in connection with the dining room.

Tom Ellis, one of our foremost flying instructors, gave a skating party honoring students and a number of friends. Prizes were awarded, however, Tommy was unable to decide who was the better "skate-pilot" or airport pilot. Among his guests were: Bill Pulley, Boyd Spear, Paul and Casey Healey, Dick Elder, Billie Witt, Bob Mugg, Charles Taylor, Kenneth Hines, Parker Shaw, Dale Keith, Bill Crowder, Roy McMillan, Melvin Parsons, Louin Berry, Dick Wilson, Lynn Allen, Jimmie Sparks, Sam Love, Dewey Dobson, Jordan Henderson, W. E. Curtis, Margaret Ewing and Mr. and Mrs. Bob Singleton.—*MARGARET EWING.*

Glendale, Calif.

Many New Instrument Ratings Acquired
Private Owners Very Active

Plosserville has the pleasure again of announcing a new plane on the field. It's little more than a week old and has been terribly busy during its entire stay here.

Rocky Gloriosso bought a new Aeronca Fifty and practiced diligently for his private license so that he could take a passenger back home to New Iberia, La., with him. He was successful in getting the license and the passenger was ready to go, but weather kept them on the ground for some time. They finally made it after a week's flying, but Joe Duckworth, the passenger, enjoyed it immensely and tells an interesting story about the trip.

Fred Bacon recently received his solo certificate from Inspector Meyers. "Frenchy" Des Champs is here from Canada and Bob is putting him right through for a Commercial. F. Ellis came down from Boeing and signed up for a Private, bought a Dart and now he and Clyde are "darting" around working toward that license. Jack and Tom Duffy of Washington have been building up time here. Tom soloed and got his license then bought an Aeronca and took it back to Washington.

Mack Salisbury and Bob Neller, members of Rudy Vallee's orchestra, started there dual time here. Jose Iturbi, concert Pianist, has been flying the Aeronca. Lew Landers has been increasing his time on the Fairchild as has G. B. Van Dusen of Minneapolis. Baron Rolf Von Kohorn from China has signed up for a solo course. He has already soloed and is trying to get his Private before going on to New York. Dr. E. S. Miller has just bought a beautiful new Stinson. Bob Simons received twenty hours of instruction as a Christmas present from his Dad, Dr. Carroll Simons. Captain O. H. Amaral and Arturo Jiminez of Pan American have started their search for the beam between trips to Mexico City. Ray Crawford also received his blind flight certificate and Johnny Milner went to Union and passed his written test from Inspector Kerr. Ralph Barton has just received his instrument rating and left for New Rochelle, New York. Others who have received their instrument ratings or are about to are: Clau Coe of Visalia, Bill Murphy, Bert Rhine, Johnny Wagner, test pilot for Vultee, Ray Barker of Denver, Pete Cavender, Russ Hankforth, Len Berenkamp and Victor James of San Antonio.

The local boys including Bob Parker, Bob Jellison and Clyde Watkins have been keeping very busy lately as has Mr. Zweng, who is working on several new texts.

Mr. Wm. Winterbottom, a British subject, came here from Chile and is working hard toward a Limited Commercial before going back to England.

Bob Ditfurth has finished his engineering course at Curtiss-Wright and is now putting in his time trying to get a Limited Commercial license.—*MAXINE SEARLE.*

Marshall, Texas

Two New Buildings on Airport
Airplane Sales Still Active

It seems that we East Texans will have to get together and sponsor a stock-model light plane air race to settle the controversy raging between the owners of all four different types of light planes as to which is the fastest. From the reports brought in by visitors to the All-American Air Maneuvers at Miami we gathered that all the jobs were pretty well souped-up.

J. O. Womack, Mgr. of the Marshall Flying Service, reports the sale of a Cub to L. E. Sullivan of Longview and a J-6-5 Eaglerock to Harold Bell of Texarkana.

"Two down and one to go" was the remark of Dick Craig, airport superintendent, concerning the buildings alongside the East-West runway. He even goes so far as to promise a new runway in the near future.

Buddy "Flash" Gordon, parachute jumper and stunt man deluxe, is again in our midst and assures us that bigger and more thrilling acts are in store for his public than ever before.

Recent visitors to the airport were Roy Taylor of Kilgore, who recently took delivery on a new Aeronca, Gordon Roberts from Gilmer in a new Cub, Newt Badgett from Shreveport in his Stinson; and George Hearne from Shreveport in his Aeronca.

Lieutenant William Lane Jr. a recent graduate from Kelly Field and his bride (nee Dorothy Steele) visited briefly in Marshall the other day. Bill has been assigned to an attack group at Barksdale Field.—*V. G. PROVENZA.*

New Orleans, La.

Shushan Airport Important Link In Radio Chain
Twins Receive Wings Under Tutelage of Mrs. Gardner

The Shushan Airport unit in a series of 100 radio beam stations linking New York and Brownsville, Texas, was inaugurated at New Orleans during January. The nation-wide chain will be welded when a similar station at Lake Charles is finished.

Two 19-year old twins who claim they have always done everything together were separated at Shushan Airport when they took off simultaneously in separate ships for their first solo flights. The twins, Ralph and Adolph Brocato, received their instruction from Mrs. Edna Gardner, instructor at the airport. They now have eight hours each, and hope to get sufficient hours to get Commercial licenses, own their own airplane and maybe someday fly on an airline—together.

Alvin Callender Airfield in Plaquemines Parish at Bellechasse has been donated to the city for use as an emergency landing field. This field was dedicated in 1926 as the largest in this part of the south, however development of Menefee and Wedell-Williams fields and Shushan Airport afterward ended its usefulness. However, Doug Langstaff, State Director of Aeronautics, stated that fogs which occasionally drop over New Orleans during the winter months do not usually extend to Callender Field, hence making it an excellent emergency field.

Shushan Airport may be expanded to a Class Four rating which calls for at least three paved runways each 4500 feet long. Airports at Baton Rouge, Lafayette, Lake Charles, Monroe, Natchitoches and Shreveport will be proposed for expansion to Class Three with at least two paved runways each 3500 feet long. A study for the purpose of ascertaining the best possible seaplane base on Lake Pontchartrain near New Orleans has been proposed in a bill introduced in Congress by Representative J. O. Fernandez.

Thomas Fortune Ryan III, executive vice-president of Mid-Central Airlines, visited New Orleans recently and predicted a brighter aeronautic future for the Crescent City. "New Orleans will be the future base of an immense Central American commerce, carried by air," he said.—*P. J. RINDERLE.*

St. Joseph, Mo.

CAA Inspector Kept Busy

The following young men have just soloed and will be going up for licenses soon if the present activity keeps up: A. D. Schneider, J. L. Holt, Jack Martin, Victor Whorlow and Russell Winters.

Elmer Bowman and Robert Hesler, are now proud possessers of their solo certificates and Bill Bowman has his Private. Keep up the good work, fellows.—*LOUIS M. NICHOLS.*

Sarasota, Florida

Number of New Planes Hangared on Airport

Flying here has taken a new spurt this season. A Stinson Reliant was recently purchased by John McKeenan who has organized Sarasota Airways, a commercial flying organization which will be closely associated with the Aero Club of Sarasota, Inc., of which McKeehan is a member.

The Aero club has placed an order for a Rearwin Sportster which will replace their Aeronca K.

Sarasota boasts more planes at its airport for a city of its size than any other town in Florida. There are now hangared here two cabin Wacos, a Waco F2, an Aeronca, a Stinson Reliant, a tri-motored Stinson, an Argo and three crop dusting ships. Sarasota is now a regular stop on the Tampa-Miami run of the National Airlines.—*RICHARD E. LINDSAY.*

Savannah, Georgia

Gar Wood Pays Visit
Army Squadron May Be Located Here

Gar Wood, noted sportsman speed boat racer and airplane pilot, visited Hunter Field recently and was a guest of Dr. H. N. Torrey at his estate on Ossabaw Island. Mr. Wood's plane is one of the biggest amphibians ever to land here.

Two Standard Oil men were also visitors recently. They were John Downing of Louisville and J. J. Carroll of New York.

Capt. Wilder Enslow's School of Aviation produced two more solo students recently, namely: Ben Thigpen and Arnold Bragg.

Maj. Frank O'Driscoll Hunter is the recent subject of Capt. Eddie Rickenbacker's "Hall of Fame of the Air."

The two iron airplanes which adorn the entrance of the municipal airport were stolen recently, but the would-be thieves didn't get very far with them. They found that the models were too heavy, so left them in nearby bushes. To avert further attempts to steal the planes, they are now welded into place.

Hunter Field was honored with a visit of the giant flying fortress of the Army. It was in command of Major Vincent J. Meloy, U. S. A., who had to put it down on account of bad weather at Barksdale.

K. A. Conway of the Young Men's Club recently visited Washington with the idea of getting a naval reserve unit in Savannah. He contacted Senators George and Russell and advises us that there is a splendid chance of our getting the proposed unit here.

Savannah has a good chance of getting the location of a squadron of fourteen pursuit airplanes with a personnel of thirty-two officers and 169 men, according to Mayor Thomas Gamble. A delegation composed of Representatives Spence M. Grayson, David S. Atkinson and Frank McNall held a conference recently with the Governor and the adjutant general and their report was very favorable.

About sixty private pilots landed here en route to Miami for the Sportsman Pilots Association cruise contest.

Warren D. (Bill) Williams, chief pilot for United Airlines, descended upon us recently. He had flown from his base, Oakland, California, to New York then stopped over here to spend a few days with his mother. We were happy to see you back with us again, Bill.

Two more students solo under the tutelage of Capt. Wilder Enslow. They are B. O. Robertson, Jr., and George Leon, Jr. With the awarding of private licenses to Miss Betty Allen, Joseph A. Perelstine and Edward Jungeman the number of licensed pilots in Savannah reached twelve including two other women, namely, Miss Alberta Barber and Mrs. Lydia Bettencourt.

Among the winter visitors to our port were Mr. and Mrs. Donald King and their parents, Mr. and Mrs. Edward King the former from Minneapolis and the latter from Sodius, Mich.—*LYDIA MUSE BETTENCOURT.*

Shreveport, Louisiana

W. N. A. A. Very Active This Month

The last meeting of the W. N. A. A. here was a Valentine dinner given in honor of Mrs. Lucy Ross, a past president of the organization who was on a visit. The members and their guests attending were: Mrs. Ross, Mr. Hamel, Eve Bernard, Norene Benefield, Tiny Hendrick, Marjorie Goodwin, Elma Rodiegne, Anna B. Wilson, Hazel Griffin, Lucile Elliott, Kathryn Newman, Mmes. Dan Leahy, C. A. Morton, R. L. Carney, Nat Pedio and Park Holland, Mr. and Mrs. Clifton Stovall, Mr. and Mrs. J. E. Elliott, Jr., and Mr. and Mrs. William Gooch.

Two new members were accepted by the local unit of W. N. A. A. at their regular monthly business meeting. They were Miss Irene Terry and Mrs. Park Holland. Because of the increase in membership and activity several new officers have been added for the coming year.

Bob Emery, John Peyton, Tommy Thompson and Ted Young, in a Cessna, flew to Bristol, Tenn., then to Cincinnati. Tommy and Bob came back in an Aeronca which will later be ferried to New Orleans by Claude Harmel and Bob Emery.

Bad weather and a series of minor accidents have kept Bob Wilson from making his test flight for a private license. Young Mr. Parker has replaced "Harkey" in the Delta field office, the latter having gone to Birmingham.

Claude Harmel, our new airport manager, cordially invites all pilots and people interested in aviation to visit Shreveport.—*MARJORIE GOODWIN.*

Springfield, Missouri

Radio Station Improved
Private Flying Increasing Daily

The government improved the radio station at Springfield and now is using simultaneous broadcasting facilities.

Congratulations to Vernon Brown who just took delivery on a new Cub "50" which is to be used for student instruction. Vernon has done a wonderful job of stimulating flying interest in Springfield.

The boys at the port have adopted a police dog and named him "Prop Wash." Gail "Stiff Breeze" Story recently soloed the Kinner (Oh Boy! another party). Student mechanic Eddie Giles soloed the Stinson S in fifteen minutes. He plans to take his L. C. on the Kinner Sportwing in the near future. Keep up the good work Eddie. R. C. "Pop" Clayton has been in Kansas City getting his instrument rating. Raymond Cleveland got his solo ticket last month. Earnest "Lindy" Sieler, plans on getting his next month.

Riley Moffit is planning to go up for his Private the next time the inspector is in. Clarence Springer, Dick Cavin, Raymond Nelson, Leonard Word and Deimer Long are piling up time on the Cub and the Aeronca.

James Cedrec Johnson, manager of the airport, bought a duck stamp last season and all he got all season was a mud-hen. We hope he has better luck with his hunting next season.

Pilot Howard Morgan and Mechanic Robert Perry made a wild dash to Salina, Kansas to bring in a disabled Waco. Arch McGregor has been having quite a time flying around the country in his Monocoupe. Arch is only eighteen and has a commercial license. Dr. Robert Smith, the flying dentist, has returned from a trip to the West Coast. Jack Cooper has been getting away from his business and civic duties long enough to fly his Waco now and then.

Jim Gillespie flies his Kinner to his beautiful ranch down in White River county quite frequently. Fred Braymer, popular Aero Exploration Company pilot, and Hurshel Wallace, the photographer, have about finished their photographic work in this section. Howard Morgan has been making several trips to Nevada, Mo., recently to train some students he has there.

Among the visitors passing through here were Capt. Crawford in his new Curtiss Wright Speedwing; M. F. Dagley in his Cessna from Lubbock; A. L. Franke in his twin-motored Gruman Ambhibian; Jack Mauldin of Brownsville in a Wasp-powered Pilgrim en route to Mexico; Dr. Manuel Gutarez Pelaez en route also to Mexico in a Warner Waco F; W. Stanton in an Aeronca from Carthage; Thomas Janis of Wichita, Ray Epperson of Bartlesville, Okla., J. H. Dickey of Continental Motor Corp., all in new Luscombe "50's."—*HERBERT HYDE.*

Tampa, Florida

New Airport Dedicated At Venice
City Now Has Direct Service to Mid-west

Venice, Florida dedicated a new airport named Fred Albee Airport recently. The land for the port was deeded by Dr. Fred Albee, an aviation enthusiast since the World War. Dr. Albee who established a clinic here in 1932 is not only a humanitarian scientist but also an enthusiastic civic leader. Ike Vermilya, President of the Palm Beach Aero Corp., was invited by Dr. Albee to give a demonstration of the Waco ambulance plane which he uses in connection with his clinic to the delegates of the Clinical Conference at which the airport was dedicated.

Tampa is now a link in the airway chain to the west with the new Eastern Airlines run from Tampa to Memphis. Many Eastern officials, headed by Capt .Eddie Rickenbacker, were the first passengers on the new run.

R. E. Burritt, executive secretary of the State National Aeronautic Association, received many gas model planes for the contest held in Miami. There were so many entries that Mr. Burritt hopes to establish a junior chapter of the N. A. A. for builders of model airplanes. —*R. E. BURRITT.*

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AIRPLANES AND ENGINES

FOR SALE: Tri-motored Stinson completely equipped with electric advertising sign and 2400 watt lighting plant. Total airplane time 1832 hours. Three Lycomings, average total time 584 hours. Since overhaul 189 hours. Standard instruments, landing lights, radio, flares. Condition fair. Exceptional value at $2,000. O. J. Whitney, Inc., 9 Rockefeller Plaza, New York City.

FOR SALE: TravelAir and Eaglerock crack-up parts. OX-5 motors and parts. OX-5 propellers. Also have best Challenger Commandaire in Texas. Write for prices. Bill Garrett, Box 188, Graham, Texas.

FOR SALE: J-5 ASO Waco, open 3-place, good condition. High performance. Only $1,000. Tom A. Lochridge, Rosharon, Texas.

You can get an AERONCA C-2 in good flying condition for only $225. New flying and control wires. Motor overhauled. M. C. Keene, Municipal Airport, Galveston, Texas.

FOR SALE

Fairchild "45" demonstrator. Total time less than 350 hours, Laidlaw upholstery, radio receiver, primary blind flight instruments, night flying equipment. A perfect job. Priced at $8,500.00

Fairchild "24" Warner motor, total time 120 hours, specially built for millionaire sportsman; has turn and bank, rate of climb, sensitive altimeter, Pioneer compass, 60 gallon tanks, RCA radio receiver, Lux remote control fire extinguisher, quick release doors, dash installed first-aid kit, electric passengers warning sign, wheel pants, special interior and exterior finish. This ship is a 1938 model, 4 passenger with ample baggage space. Hood is included for blind flying. Priced at $5,750.00

Fairchild "24" Ranger motor, 1936 model, beautiful red finish trimmed in black, turn and bank, rate of climb, sensitive altimeter, thermocouple and other extras. This ship is a real bargain. Price on request.

1936 Stinson, Lycoming with Smith controllable propeller, night and primary blind flight instruments, cactus proof tires and many extras. This ship was in the Los Angeles Air Show and a beautiful job. 2-way radio. Priced at $4,990.00

1935 Custom Waco, 225 Jacobs with 350 hours total, 50 since factory major, beautiful black and yellow hand rubbed finish, radio receiver, landing and position lights, flares, primary blind flight instruments and perfect throughout. This job really gets along. Priced at $3,250.00

1932 Waco, Continental, night equipment, flares and everything, just the thing for a local operator to make money with. Priced at $1,750.00

1936 Porterfield 70 LeBlond. This motor has just received a major overhaul, ship refinished about 20 hours back, rate of climb, turn and bank, radio receiver, seat covers, brakes and controls both seats, new pyralin throughout. Dandy condition. Priced at $1,250.00

1935 Porterfield 70 LeBlond in very nice condition and just the thing for pilots needing something heavy for advanced work. Priced at $1,000.00

Taylorcraft Model A, 1938, red trimmed in black, tailwheel and brakes, wheel pants, compass. In perfect condition. A bargain.

Taylorcraft demonstrator, Model BF, Franklin "50" engine, tailwheel and brakes, wheel pants and compass. Price on request.

KINNER R-5, 160 h.p. engine, no time since major overhaul. Price on request.

CONTINENTAL 210 h.p. engine, no time since major overhaul. New type forged pistons. Sodium cooled valves. Bargain for cash.

Wright Gypsy engine parts and the following instruments for sale at bargain prices: (3) Turn and Bank; (2) Rate of Climb; (1) Sensitive Altimeter; (2) Aperiodic Compass; (Pioneer Compass); (3) Altimeter.

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AIR ACTIVITIES

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Love Field Dallas, Texas

LARGEST STOCK IN SOUTHWEST

ARROW SPORT '37 Deluxe gullwing, 161 hrs. Lights, tail wheel $900

BEECHCRAFT '36 Jacobs 285 hp. 2-way radio, B-F and night instrs., sensitive altimeter. Total time on new engine 26 hrs. $6750

BEECHCRAFT 420 Wright. Perfect Condition. All instrs. $6750

BEECHCRAFT Wasp Jr. 450 hp. Total 100 hrs. Horizon, gyro compass, two-way radio, all instrs., 4 parachutes, night equipment $15850

CESSNA 1936, 145 Warner, special instruments and equipment $3500

CUB '36 Model. Color gold. Just relicensed. Perfect condition $850

FAIRCHILD '34 Model 24 Warner 145 hp. Bank and turn, rate of climb, RCA receiver, wheel pants $2500

HOWARD 1937 DGA-8, 320 Wright, Sperry insts., 2-way radio, night flying equip., perfect condition $7900

ROBIN, Challenger engine. Color red. Engine majored, relicensed $750

RYAN SC Warner 145 hp. Demonstrator. Like new $5000

SPARTAN J6-5 engine. Cover perfect. Cowling ring, steel prop, dual, rate of climb, bank and turn, compass, airspeed, altimeter $900

STINSON '34 Lycoming 245 hp. 100 hrs. since major. Recovered. Starter, generator, lights, radio, B-F instrs., controllable prop $2950

STINSON 1936, 320 Wright, no time since factory overhaul, special job, blind and night flying, Ham. Cont. Prop. $7500

STINSON Lycoming 215 hp. Ship and engine perfect condition $1400

WACO J-5 Open, 3-place. New Cover. 85 hrs. since major. Military windshield, sensitive alt., starter, gen., 850 x 10 wheels $1350

WACO AMBULANCE 36 285 Wright, radio compass, transmitter, Hamilton con. prop., exceptionally fine $5750

Complete description on request. Trades. Time Payment, 50% down.

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LOVE FIELD · DALLAS, TEXAS

QUICK SHIPMENT OF REPLACEMENT PARTS FROM STOCK

By The Old Cowhand

Well sir, the Old Cowhand is back. Have been in a fog two months. Had to close up the feed trough at the Ranch and am now opening my own bean cans. Reckon I got to givin too much grub on the 35c lunch. Still sellin the largest conglomeration of junk for pilots in the United States if you don't believe it ask the Steve Club.

* * *

The ranch ain't the same sweet place now that we got in on the Govt. college boy training program. Cowhand Ritchey has 30 of the boys from N. T. A. C. They spend more time riding 20 miles to and from the school than they do takin flying. Why don't they hold ground school classes in the bus? Papers say the Govt. is going to train 20,000 pilots. We know about 20,000 who can fly pretty good now that is starvin to death. There's something wrong with a deal like that.

* * *

One of the airline hands wants to know why the hell if folks can go out in west texas and salvage 3,000,000 bucks worth of war material out of scrap iron then any dumb cluck could go into the Rocky Mts. and salvage a 1,000,000 bucks worth of airplane instruments.

* * *

We got a light that is operated like a gun up in the control tower. A pilot comes breezing in and looks into the tower. If the ranch hand ain't asleep or listening to Fibber McGee, he jumps up, grabs the new gadget and points it at the pilot. If it is green the pilot can land. If it's red he flys around Buck Sansom's ranch for a spell, they comes back for another try. You gotta be invited in nowadays. Flying is getting so sissy they'll probably start pink teas every afternoon in the lobby.

* * *

Had a complaint from a pilot the other evening. A necking party was going on at the end of the north runway. The parkers left their parking lights on and the pilot run out of gas circling and waiting for the green light.

* * *

Guess I'm getting too old to gad about the country much any more, besides have to work to hard to get to any of the airplane races, but looks like I'm ahead of the game after what they say about the last Miami races which was a dud in everybody's opinion. Miami says to themselves that pilots are biggest chumps in the world so this year let's promote the hell out of them. The pilots fell hook line and sinker, especially the flivver boys who live on hamburgers during the week so's to fly an hour or two on Sundays. If it hadn't of been for Gulf givin the gas and oil they'd all be in Florida yet in the workhouse. They don't want no more of Miami. Wish I could have seen Johnny Livingston fly again tho. They say he was plenty hot in Clare Bunch's clipped wing Monocoupe down there, done all the good and chopped all the wood.

* * *

Well, I reckon all these new fangled regulations must be some help as they ain't so much grandstand flying around the ranch anymore. Get out of sight tho and it's the same old stuff.

* * *

Business has picked up on the old Chisolm Trail for the covered wagons of American, Delta and Braniff have been loaded to the gills the last couple of months. Sure something wrong when they go out full all the time and still don't make no money. One thing—they ain't paying it out in salaries. Ask the Ground Crew.

* * *

If cowtown keeps on we'll get a airplane factory yet. Always did think we could produce something besides cows and it won't hurt me none.

* * *

Al Williams says get out of the Navy in case of the next war. The pilots will take off from their carrier, go do their job and come back but no carrier. Al says it sure will be lonesome out there.

* * *

Got two fan mail letters. One was from my old friend George Wheeler at the Dearborn Inn. The other wasn't signed but he sent me this from West Texas:

What an easy life the Air Corps lead
With the best of equipment and plenty of speed
A regular salary and snappy clothes
Not ever a worry what the student owes.

A grease ball on hand to pull the prop
The best of instruments to stay on top
When things get tough and they have to lam
Why worry—it belongs to Uncle Sam.

Do I envy the guys?—Not one pea
I don't have to make no reveille
No inspection and no review
No always waiting for my que.

If I am tired and want to sleep
Under the wing I fall in a heap
Cross-country trips I make O. K.
Providing the railroad is going my way.

Work? Hell yes, from sun to sun.
But what do I care it's all my mon
Be it profit or be it loss,
I am content for I'm my own boss.

* * *

Have a good idea for Governor W. Lee to raise the 30 dollars per month for the old folks. Put the slot machines to work again, hang a sign on them as follows: "Put it in now boys and we'll save it for you til you're 65." O'Daniel needs ideas like that.

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Look at a "Chief" 50 — you, too, will say it's a real buy — see its luxurious cabin interior, comfortable side by side seating, crown top, streamlined fuselage and cowling, and all of its outstanding features that are creating such enthusiastic comments. Then fly it — get the feel of its spirited performance, the flyability and easy control that novice and experienced pilots, alike, are praising. Aeronca's engineering and craftsmanship is matchless — recent news making, record breaking flights have proven the "Chief's" stamina, safety, speed, and economy. You'll agree after your free flight demonstration that the "Chief" 50 is justly called "Proven Champion of the Low-Price Field" Write for free literature and your Aeronca dealer's name today.

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Aeronca dealers, everywhere, are experiencing increased activity — selling more airplanes because of the sensational "Chief" 50. Everyone is saying — "Look to Aeronca for Leadership". Yes, 1939 is an Aeronca year. If you are a dealer, better write today and find out about Aeronca's valuable franchise and aggressive, helpful sales policy.

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Such progressive advancement in both design and production is based on constant research into the problems of air transportation. It is evidenced in every phase of Lockheed construction and performance ... from the economical accessibility of control units to the increased revenue miles per operating dollar.

Lockheed invites your inspection of its unsurpassed record of economical performance in the service of 28 airlines throughout the world. Compiled data applicable to the particular use of any Lockheed model will be furnished upon request.

* *Anodization is an electro-chemical oxidation of the surface of a metal which produces an oxide film highly resistant to corrosion.*

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